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(54) MEASURING APPARATUS FOR INTERNAL QUALITY OF OBJECT

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a measuring apparatus, in which the change in a baseline is excluded

without suspending measurements and by which the internal quality of an object to be inspected can be measured by a method, wherein when an interval is formed between objects, to be inspected, conveyed on a conveyance means, a reference object is inserted into a measuring optical path so as to perform a calibration.
SOLUTION: Before the measurement of the internal quality of every object 8 to be inspected (fruits and vegetables) is started, a reference object (a filter) 30 having a specific optical characteristic is arranged in front of a lamp 12. A quantity of light which is incident on a spectroscope 16 via the filter 30 is measured, and it is converted into a current value to be retained in a computing part 20 as a baseline for measurement (a reference value). Then, the filter 30 is made to retreat from an optical path, and the internal quality of every object 8, to be inspected which is moved on a belt 3 is measured. When the measurement is continued, the baseline changes. Hence an interval is formed between objects 8 to be inspected, at a a prescribed value or higher, a signal is sent to a calibration drive mechanism 32 from a control part 18. The filter 30 is moved into a measuring optical path so as to perform calibration, and the baseline is made always constant.

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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] A conveyance means to convey an object continuously, and a detection means to detect the location of this object laid on said conveyance means, By the light which a floodlighting means to floodlight a measuring beam to this object, a light-receiving means to receive the light which penetrated this object, and said light-receiving means received It is based on a signal from an analysis means to analyze the internal quality of this object, and said detection means. It has a reference object insertion means to insert the reference object which has a predetermined optical property into the optical path between said floodlighting means and light-receiving means. Said analysis means The internal quality measuring device of the object characterized by comparing the light which received light when this reference object was inserted with the reference data held beforehand, and amending this analysis result.

[Claim 2] This reference object is the internal quality measuring device of the object according to claim 1 characterized by being the light filter which has a specific optical property.
[Claim 3] This reference object is the internal quality measuring device of the object according to claim 1 characterized by being a false object object.
[Claim 4] Furthermore, have an electric shielding means to cover the light which carries out incidence to said light-receiving means, and with said detection means, while having judged that spacing of this object on said conveyance means is under a predetermined value Make this object floodlight said reference object insertion means, without minding this reference object from said floodlighting means, and said light-receiving means is made to observe the light which penetrated this object. With said detection means When it is judged that spacing of this object on said conveyance means is beyond a predetermined value Said reference object insertion means adjusts the quantity of light which carries out incidence to said light-receiving means by arranging this reference object in the optical path between said floodlighting means and said light-receiving means. The observation by said light-receiving means when making said light-receiving means observe the adjusted this quantity of light, and controlling the amount of incident light for the observation by said light-receiving means by said reference object insertion means further, The internal quality measuring device of the object according to claim 1 characterized by having an operation means to amend based on the observation by said light-receiving means when covering incident light with an electric shielding means.
[Claim 5] When it is judged with said detection means that spacing of this object on said conveyance means is beyond a predetermined value The light which adjust the quantity of light which carries out incidence to said light-receiving means with said reference object insertion means, and said light-receiving means is made to observe the this adjusted quantity of light, and carries out incidence to said light-receiving means with said electric shielding means further after that is covered. Said light-receiving means is made to observe in this condition. Or the light which carries out incidence to said light-receiving means with said electric shielding means is covered. Make said light-receiving means observe in this condition, and the electric shielding of light which carries out incidence to said light-receiving means with said electric shielding means is canceled after that. The internal quality measuring

device of the object according to claim 4 characterized by adjusting the quantity of light which carries out incidence to said light-receiving means with said reference object insertion means, and making said light-receiving means observe the this adjusted quantity of light.
[Claim 6] This false object object is the internal quality measuring device of the object according to claim 3 characterized by having a transparence container and the light transmission object which consists of a water solution held into this container.
[Claim 7] The internal quality measuring device of the object according to claim 6 characterized by mixing the light-scattering object in this water solution of this light transmission object.
[Claim 8] It is the internal quality measuring device of the object according to claim 7 characterized by at least one side face having different thickness from other side faces among the side faces of this transparence container.
[Claim 9] The thickness of the side face of this transparence container is the internal quality measuring device of the object according to claim 7 characterized by differing on the side face which is the same on the side face in which it faces, and adjoins.
[Claim 10] The thickness of the side face of this transparence container is the internal quality measuring device of the object according to claim 6 characterized by the uniform thing.
[Claim 11] This transparence container is the internal quality measuring device of the object according to claim 6 or 7 characterized by including glass.
[Claim 12] This transparence container is the internal quality measuring device of the object according to claim 6 or 7 characterized by including a vinyl chloride.
[Claim 13] This transparence container is the internal quality measuring device of the object according to claim 6 or 7 characterized by including polyethylene.
[Claim 14] This transparence container is the internal quality measuring device of the object according to claim 6 or 7 characterized by including polyfluoroethylene.
[Claim 15] This transparence container is the internal quality measuring device of the object according to claim 14 characterized by including graphite.
[Claim 16] The internal quality measuring device of the object according to claim 6 characterized by having prepared the light-scattering layer in the 1st [at least] page of this transparence container.
[Claim 17] This light-scattering layer is the internal quality measuring device of the object according to claim 16 characterized by including resin.
[Claim 18] This light-scattering layer is the internal quality measuring device of the object according to claim 16 characterized by including a cellulose.
[Claim 19] This light-scattering layer is the internal quality measuring device of the object according to claim 17 or 18 characterized by being an adhesive tape.
[Claim 20] This light-scattering layer is the internal quality measuring device of the object according to claim 17 or 18 characterized by being formed of paint.
[Claim 21] The internal quality measuring device of the object according to claim 6 characterized by having formed heat resisting glass in at least one side face of this transparence container.
[Claim 22] The internal quality measuring device of the object according to claim 7 characterized by having formed heat resisting glass in at least one side face of this transparence container.
[Claim 23] This heat resisting glass is the internal quality measuring device of the object according to claim 21 or 22 characterized by consisting of two or more heat-resisting glass layers, and having prepared the layer of water in at least one gap among the gaps between these heat-resisting glass layers.
[Claim 24] This heat resisting glass is the internal quality measuring device of the object according to claim 21 or 22 characterized by consisting of two or more heat-resisting glass layers, and having prepared the layer of the water solution of an acid in at least one gap among the gaps between these heat-resisting glass layers.
[Claim 25] This heat resisting glass is the internal quality measuring device of the object according to claim 21 or 22 characterized by consisting of two or more heat-resisting glass layers, and having prepared the layer of the water solution of sugar in at least one gap among the gaps between these heat-resisting glass layers.

[Claim 26] The internal quality measuring device of the object according to claim 21 characterized by having prepared the layer of water between this transparence container and this heat resisting glass.
[Claim 27] The internal quality measuring device of the object according to claim 21 characterized by having prepared the layer of the water solution of an acid between this transparence container and this heat resisting glass.
[Claim 28] The internal quality measuring device of the object according to claim 21 characterized by having prepared the layer of the water solution of sugar between this transparence container and this heat resisting glass.
[Claim 29] This transparence container is the internal quality measuring device of the object according to claim 6 or 7 characterized by the pivotable thing a core [the shaft which is parallel to the height direction of this transparence container, and passes along a core at the bottom].
[Claim 30] This transparence container is the internal quality measuring device of the object according to claim 6 or 7 characterized by the pivotable thing a core [a shaft parallel to the height direction of this transparence container].
[Claim 31] This transparence container is the internal quality measuring device of the object according to claim 6 or 7 characterized by the pivotable thing a core [a shaft perpendicular to the optical axis of this measuring beam horizontal and floodlighted from said floodlighting means].
[Claim 32] This false object object is the internal quality measuring device of the object according to claim 3 characterized by having a transparence container and the light transmission object which was held into this container, and which the water solution was made to diffuse a light-scattering object, and added and gelled the gelling agent further.
[Claim 33] This false object object is the internal quality measuring device of the object according to claim 6 or 7 characterized by having a thermometry means to measure the temperature of said light transmission object.
[Claim 34] Said water solution is the internal quality measuring device of the object according to claim 6 or 7 characterized by being the water solution of an acid.
[Claim 35] This acid is the internal quality measuring device of the object according to claim 34 characterized by being a citric acid.
[Claim 36] This water solution is the internal quality measuring device of the object according to claim 6 or 7 characterized by being the water solution of sugar.
[Claim 37] This sugar is the internal quality measuring device of the object according to claim 36 characterized by being a cane sugar.
[Claim 38] This light-scattering object is the internal quality measuring device of the object according to claim 7 characterized by being floating fines.
[Claim 39] This light-scattering object is the internal quality measuring device of the object according to claim 7 characterized by being a colloidal particle.
[Claim 40] This light-scattering object is the internal quality measuring device of the object according to claim 38 or 39 characterized by being cerium oxide.
[Claim 41] This light-scattering object is the internal quality measuring device of the object according to claim 38 or 39 characterized by being titanium oxide.
[Claim 42] Said floodlighting means floodlights light to an object in the predetermined location in the moving trucking of the object by said conveyance means. Said light-receiving means It is the internal quality measuring device of the object according to claim 6 characterized by being prepared near [said] the predetermined location, receiving the light which carried out outgoing radiation of the object in said predetermined location, installing this false object object in said predetermined location at the time of amendment actuation, and amending internal quality measurement of an object using this false object object.
[Claim 43] Furthermore, the internal quality measuring device of the object according to claim 42 with which this false object object is characterized by having a rise-and-fall means to make it go up and down said false object object between the downward location located in said predetermined location, and the rise location evacuated from said predetermined location.

[Claim 44] It is the internal quality measuring device of the object according to claim 6 or 7 characterized by for these reference objects being these two or more false object objects, and for the concentration of said water solution of two or more of these false object objects differing mutually, and amending internal quality measurement of an object using these two or more false object objects.
[Claim 45] It is the internal quality measuring device of the object according to claim 44 which said two or more false object objects are installed on a revolver member pivotable to the circumference of a predetermined shaft, and is characterized by a false object object carrying out a sequential location between said floodlighting means and said light-receiving means by rotation of said revolver member at the time of amendment actuation of equipment.
[Claim 46] It is the internal quality measuring device of the object according to claim 45 which said revolver member has a through hole and is characterized by being projected on the light from said floodlighting means by the object through this through hole at the time of the usual measurement of those other than the time of said amendment actuation.
[Claim 47] Furthermore, the internal quality measuring device of the object according to claim 1 characterized by having the amount control means of floodlighting which controls the amount of floodlighting according to the class of this object, and a position control means to control arrangement of said floodlighting means, said conveyance means, and said light-receiving means according to the magnitude of this object.
[Claim 48] Said amount control means of floodlighting is the internal quality measuring device of the object according to claim 47 characterized by having a diaphragm and changing the magnitude of the opening aperture of this diaphragm according to the magnitude of this object.
[Claim 49] It is the internal quality measuring device of the object according to claim 48 which said amount control means of floodlighting has the gobo which has two or more stomata, and the gobo migration means to which said gobo is moved, and is characterized by for one of these the stomata being on the optical axis of said floodlighting means, and arranging it between said floodlighting means and these objects by said gobo migration means according to the magnitude of this object.
[Claim 50] It is the internal quality measuring device of the object according to claim 49 which a configuration is a rectangle, and, as for said gobo, these two or more stomata are prepared on the straight line of the arbitration within the field, and is characterized by said gobo moving with said gobo migration means in this straight-line top.
[Claim 51] It is the internal quality measuring device of the object according to claim 49 which the configuration of said gobo is circular, it is in the field, and these two or more stomata are prepared in the equidistant location from the core of this circle, and is characterized by said gobo revolving around this core with said gobo migration means.
[Claim 52] Furthermore, it is the internal quality measuring device of the object according to claim 47 which has a diameter detection means detect the diameter of this object, and is characterized by for said floodlighting means to floodlight light on the outskirts of the equatorial section of the object this conveyed by controlling arrangement of said floodlighting means, said conveyance means, and said light-receiving means by said position control means based on the diameter detection result by said diameter detection means.
[Claim 53] An upstream detection means for it to be prepared in the upstream rather than said light-receiving means, and to detect the location of the object on said conveyance means in the conveyance path by said conveyance means, It is based on the output of the monitor means which acts as the monitor of the movement magnitude of said conveyance means, and a said upstream detection means and said monitor means. The internal quality measuring device of the object according to claim 1 characterized by having the control means controlled to make light-receiving by this light-receiving means perform when said object on a conveyance means passes through the light-receiving location of said light-receiving means.
[Claim 54] It is the internal quality measuring device of the object according to claim 53 characterized by controlling to make light-receiving by the light-receiving means perform when said upstream detection means detects the transverse diameter of the conveyance direction of an object, said control

means computes the center position of the conveyance direction of this object based on the detected transverse diameter and the core of this object passes through the light-receiving location of a light-receiving means.
[Claim 55] Furthermore, a downstream detection means for it to be prepared in the downstream rather than said light-receiving means of said conveyance path, and to detect the location of the object on said conveyance means, The location on the conveyance means of a certain object detected by said upstream detection means is compared with the location on the conveyance means of the same object detected by said downstream detection means. The internal quality measuring device of the object according to claim 53 characterized by having with an error judging means to judge with a measurement error when a gap is in both locations.
[Claim 56] Furthermore, a downstream detection means for it to be prepared in the downstream rather than said light-receiving means of said conveyance path, and to detect the location of the object on said conveyance means, The location on the conveyance means of a certain object detected by said upstream detection means is compared with the location on the conveyance means of the same object detected by said downstream detection means. The internal quality measuring device of the object according to claim 54 characterized by having with an error judging means to judge with a measurement error when a gap is in both locations.
[Claim 57] Furthermore, a downstream detection means for it to be prepared in the downstream rather than said light-receiving means of said conveyance path, and to detect the transverse diameter of the conveyance direction of said object, An error judging means to judge with a measurement error when the transverse diameter of the conveyance direction of the object detected by said upstream detection means is compared with the migration direction transverse diameter of the object detected by said downstream detection means and a gap is in both transverse diameter, The internal quality measuring device of the object according to claim 54 characterized by ****(ing).
[Claim 58] Furthermore, the internal quality measuring device of the object according to claim 55 characterized by having a classification means to classify into remeasurement the object judged by said error judging means to be an error.
[Claim 59] Furthermore, the internal quality measuring device of the object according to claim 56 characterized by having a classification means to classify into remeasurement the object judged by said error judging means to be an error.
[Claim 60] Furthermore, the internal quality measuring device of the object according to claim 57 characterized by having a classification means to classify into remeasurement the object judged by said error judging means to be an error.
[Claim 61] Furthermore, the 1st optical fiber which arranges one edge in the location which can direct receive the light by which outgoing radiation is carried out from said floodlighting means, connects the other-end section to said light-receiving means, and receives the light from said floodlighting means, without minding this object, A quantity of light adjustment means to adjust the quantity of light of the light which is prepared in the middle of the edge of said 1st optical fiber, or an optical path, and passes along said optical fiber, A 1st electric shielding means to cover the light which is prepared in the middle of the edge of said 1st optical fiber, or an optical path, and passes along said 1st optical fiber, The 2nd optical fiber which receives the light which has arranged in the location which can receive the light by which outgoing radiation is carried out from this object in one edge, connected the other-end section to said light-receiving means, and penetrated this object, A 2nd electric shielding means to cover the light which is prepared in the middle of the edge of said 2nd optical fiber, or an optical path, and passes along said 2nd optical fiber, Based on the detection result by said detection means, it has the control means which controls actuation of said 1st electric shielding means and said 2nd electric shielding means. With said detection means While having judged that spacing of this object on said conveyance means is under a predetermined value Said control means covers said 1st optical fiber with said 1st electric shielding means, and the light which carried out incidence to said light-receiving means from said 2nd optical fiber is made to observe. With said detection means When it is judged that spacing of this object on said conveyance means is beyond a predetermined value Said control means covers said 2nd optical fiber

with said 2nd electric shielding means. The observation by said light-receiving means when making the light which carried out incidence to said light-receiving means through said quantity of light adjustment means from said 1st optical fiber observe, and controlling the amount of incident light for the observation by said light-receiving means by said control means further, The internal quality measuring device of the object according to claim 1 characterized by having an operation means to amend based on the observation by said light-receiving means when covering incident light with said electric shielding means.

[Claim 62] Furthermore, the internal quality measuring device of the object according to claim 61 characterized by having an observation means to make the light which covered said 2nd optical fiber with said 2nd electric shielding means, and carried out incidence to said light-receiving means through said quantity of light adjustment means irrespective of the detection result by said detection means from said 1st optical fiber at the time of arbitration observe.

[Claim 63] When it is judged with said detection means that spacing of this object on said conveyance means is beyond a predetermined value Cover said 2nd optical fiber with said 2nd electric shielding means, and make the light which carried out incidence to said light-receiving means through said quantity of light adjustment means from said 1st optical fiber observe, and said 1st optical fiber is further covered with said 1st electric shielding means after that. Said light-receiving means is made to observe, after said 1st optical fiber and said 2nd optical fiber have covered. Or said 1st optical fiber and said 2nd optical fiber are covered with said 1st electric shielding means and said 2nd electric shielding means. Make said light-receiving means observe, after said 1st optical fiber and said 2nd optical fiber have covered, and said 1st optical fiber is wide opened by opening the 1st electric shielding means of the account of back to front. The internal quality measuring device of the object according to claim 62 characterized by making the light which carried out incidence to said light-receiving means through said quantity of light adjustment means from said 1st optical fiber observe.

[Claim 64] It is the internal quality measuring device of the object according to claim 1 characterized by receiving the light which said floodlighting means was floodlighted from the side to this object in the predetermined location in the moving trucking of this object, and said light-receiving means was established above this object in this predetermined location, and was penetrated from this object to the upper part.

[Claim 65] The internal quality measuring device of the object according to claim 64 characterized by having further the protection-from-light plate for shading so that the stray light may not go into said light-receiving means which is the side of the object in said predetermined location, and was prepared above the floodlighting location to the object top by said floodlighting means below the height of an object.

[Claim 66] Said floodlighting means and a protection-from-light plate are the internal quality measuring device of the object according to claim 65 characterized by preparing in both sides on both sides of said migration means, and being able to adjust spacing between both protection-from-light plates.

[Claim 67] Furthermore, the internal quality measuring device of the object according to claim 66 characterized by having a transverse-diameter measurement means to be installed in the upstream and to measure the transverse diameter of said object rather than said predetermined location in said moving trucking, and an accommodation means to adjust spacing of said protection-from-light plate based on the output of this transverse-diameter measurement means.

[Claim 68] Furthermore, the internal quality measuring device of the object according to claim 64 characterized by having the protection-from-light plate for shading so that the stray light may not go into said light-receiving means prepared above the height of the object in said predetermined location.

[Claim 69] Furthermore, the internal quality measuring device of the object according to claim 68 characterized by having a height measurement means to be installed in the upstream and to measure the height of said object rather than said predetermined location in said moving trucking, and an accommodation means to adjust the height of said protection-from-light plate based on the output of this height measurement means.

[Claim 70] Further A size measurement means to be installed in the upstream and to measure at least the

height of said object, or one side of the transverse diameter rather than said predetermined location in said moving trucking, The protection-from-light plate which is a protection-from-light plate for shading so that the stray light may not go into said light-receiving means, is prepared near the object in said predetermined location, and can carry out a drive to the circumference of a predetermined horizontal axis, The internal quality measuring device of the object according to claim 64 characterized by having an accommodation means to adjust the angular position of the circumference of said horizontal axis of said protection-from-light plate so that the clearance between said protection-from-light plate and the object in said predetermined location may become small, based on the output of said size measurement means.

[Claim 71] Furthermore, it is a protection-from-light plate for shading so that the stray light may not go into said light-receiving means. It is prepared near the object in said predetermined location, and a drive can be carried out to the circumference of a predetermined horizontal axis. When it is moved by said migration means and said object approaches said predetermined location, it is pushed up with this object and a drive is carried out to the circumference of said horizontal axis. The internal quality measuring device of the object according to claim 64 characterized by having the protection-from-light plate which shades where this object is touched, when this object is in said predetermined location.

[Claim 72] The internal quality measuring device of the object according to claim 71 characterized by preparing the upward curling for permitting missing this protection-from-light plate upwards when an object is touched in the corner of the side which touches an object by said moving trucking upstream of said protection-from-light plate.

[Claim 73] It is the internal quality measuring device of the object according to claim 64 characterized by having opening which was able to be opened so that it might have further the tray for receiving said object fixed on said migration means, and this tray might have covered some received objects [at least] and the light from said floodlighting means might reach an object.

[Claim 74] A conveyance means to be the internal quality measuring device of an object and to convey an object continuously, A detection means to detect spacing of this object laid on said conveyance means, A floodlighting means to floodlight light to this object, and a light-receiving means to observe the light which penetrated this object, An electric shielding means to cover the light which carries out incidence to said light-receiving means, and a quantity of light adjustment means to adjust the quantity of light of the light floodlighted from said floodlighting means, Based on the detection result by said detection means, it has the control means which controls the quantity of light which carries out incidence to said light-receiving means. With said detection means While having judged that spacing of this object on said conveyance means is under a predetermined value Make this object floodlight said control means, without minding said quantity of light adjustment means from said floodlighting means, and said light-receiving means is made to observe the light which penetrated this object. With said detection means When it is judged that spacing of this object on said conveyance means is beyond a predetermined value Said control means adjusts the quantity of light which carries out incidence to said light-receiving means with said quantity of light adjustment means. The observation by said light-receiving means when making said light-receiving means observe the adjusted this quantity of light, and controlling the amount of incident light for the observation by said light-receiving means by said control means further, The internal quality measuring device of the object characterized by having an operation means to amend based on the observation by said light-receiving means when covering incident light with said electric shielding means.

[Claim 75] When it is judged with said detection means that spacing of this object on said conveyance means is beyond a predetermined value Said control means covers the light which adjust the quantity of light which carries out incidence to said light-receiving means with said quantity of light adjustment means, and said light-receiving means is made to observe the this adjusted quantity of light, and carries out incidence to said light-receiving means with said electric shielding means further after that. Said light-receiving means is made to observe in this condition. Or the light which carries out incidence to said light-receiving means with said electric shielding means is covered. Make said light-receiving means observe in this condition, and the electric shielding of light which carries out incidence to said

light-receiving means with said electric shielding means is canceled after that. The internal quality measuring device of the object according to claim 74 characterized by adjusting the quantity of light which carries out incidence to said light-receiving means with said quantity of light adjustment means, and making said light-receiving means observe the this adjusted quantity of light.
[Claim 76] The amendment approach of internal quality measurement of the object characterized by to measure to the false object object which is the amendment approach of the internal quality measurement of an object which performs by carrying out the spectral analysis of the light which irradiated light, was scattered on the object inside the object, and carried out outgoing radiation to it from the object, and contains the water solution which melted a medium in water, and to amend the measurement result of an object based on the measurement result of this false object object.
[Claim 77] The amendment approach of internal quality measurement of the object according to claim 76 characterized by mixing the optical dispersing element in said water solution.
[Claim 78] Said amendment is the amendment approach of internal quality measurement of the object according to claim 76 or 77 characterized by carrying out based on the difference of the value acquired by the measurement to said false object object, and a predetermined reference value.
[Claim 79] The amendment approach of internal quality measurement of the object according to claim 76 or 77 characterized by measuring the temperature of said false object object and amending further based on this thermometry result.
[Claim 80] Said medium is the amendment approach of internal quality measurement of the object according to claim 76 or 77 characterized by being an acid.
[Claim 81] Said acid is the amendment approach of internal quality measurement of the object according to claim 80 characterized by being a citric acid.
[Claim 82] Said medium is the amendment approach of internal quality measurement of the object according to claim 76 or 77 characterized by being sugar.
[Claim 83] Said sugar is the amendment approach of internal quality measurement of the object according to claim 82 characterized by being a cane sugar.
[Claim 84] Said medium is the amendment approach of internal quality measurement of the object according to claim 76 or 77 characterized by being an acid and sugar.
[Claim 85] The amendment approach of internal quality measurement of the object characterized by to be the amendment approach of the internal quality measurement of an object which performs by carrying out spectral analysis of the light which irradiated light, was scattered on the object inside the object, and carried out outgoing radiation to it from the object, and for fluctuation by the environmental variation of a transmitted light spectrum to measure to a false object object almost equivalent to a real object, and to amend the measurement result of an object based on the measurement result of this false object object.
[Claim 86] Said amendment is the amendment approach of internal quality measurement of the object according to claim 85 characterized by carrying out based on the difference of the value acquired by the measurement to said false object object, and a predetermined reference value.
[Claim 87] The amendment approach of internal quality measurement of the object according to claim 85 or 86 characterized by measuring the temperature of said false object object and amending further based on this measurement result.
[Claim 88] The false object object which is a false object object used for amendment of the internal quality measuring device of the object by spectral analysis, and is characterized by having a transparence container and the light transmission object which consists of a water solution held into this container.
[Claim 89] The false object object according to claim 88 characterized by mixing the light-scattering object in this water solution of this light transmission object.
[Claim 90] It is the false object object according to claim 89 characterized by at least one side face having different thickness from other side faces among the side faces of this transparence container.
[Claim 91] The thickness of the side face of this transparence container is a false object object according to claim 89 characterized by differing on the side face which is the same on the side face in which it

faces, and adjoins.
[Claim 92] The thickness of the side face of this transparence container is a false object object according to claim 88 or 89 characterized by the uniform thing.
[Claim 93] This transparence container is a false object object according to claim 88 or 89 characterized by including glass.
[Claim 94] This transparence container is a false object object according to claim 88 or 89 characterized by including a vinyl chloride.
[Claim 95] This transparence container is a false object object according to claim 88 characterized by including polyethylene.
[Claim 96] This transparence container is a false object object according to claim 88 characterized by including polyfluoroethylene.
[Claim 97] This transparence container is a false object object according to claim 95 or 96 characterized by including graphite.
[Claim 98] The false object object according to claim 88 characterized by having prepared the light-scattering layer in the 1st [at least] page of this transparence container.
[Claim 99] This light-scattering layer is a false object object according to claim 98 characterized by having resin.
[Claim 100] This light-scattering layer is a false object object according to claim 98 characterized by having a cellulose.
[Claim 101] This light-scattering layer is a false object object according to claim 99 or 100 characterized by being an adhesive tape.
[Claim 102] This light-scattering layer is a false object object according to claim 99 or 100 characterized by being formed of paint.
[Claim 103] The false object object according to claim 88 characterized by having formed heat resisting glass in at least one side face of this transparence container.
[Claim 104] The false object object according to claim 89 characterized by having formed heat resisting glass in at least one side face of this transparence container.
[Claim 105] This heat resisting glass is a false object object according to claim 103 or 104 characterized by consisting of two or more heat-resisting glass layers, and having prepared the layer of water in at least one gap among the gaps between these heat-resisting glass layers.
[Claim 106] This heat resisting glass is a false object object according to claim 103 or 104 characterized by consisting of two or more heat-resisting glass layers, and having prepared the layer of the water solution of an acid in at least one gap among the gaps between these heat-resisting glass layers.
[Claim 107] This heat resisting glass is a false object object according to claim 103 or 104 characterized by consisting of two or more heat-resisting glass layers, and having prepared the layer of the water solution of sugar in at least one gap among the gaps between these heat-resisting glass layers.
[Claim 108] The false object object according to claim 103 characterized by having prepared the layer of water between this transparence container and this heat resisting glass.
[Claim 109] The false object object according to claim 103 characterized by having prepared the layer of the water solution of an acid between this transparence container and this heat resisting glass.
[Claim 110] The false object object according to claim 103 characterized by having prepared the layer of the water solution of sugar between this transparence container and this heat resisting glass.
[Claim 111] It is the false object object used for amendment of the internal quality measuring device of the object by spectral analysis, and this false object object has a transparence container and the light transmission object which was held into this container and which the water solution was made to diffuse a light-scattering object, and added and gelled the gelling agent further.
[Claim 112] This false object object is a false object object according to claim 88 or 89 characterized by having a thermometry means to measure the temperature of said light transmission object.
[Claim 113] Said water solution is a false object object according to claim 88 or 89 characterized by being the water solution of an acid.
[Claim 114] This acid is a false object object according to claim 113 characterized by being a citric acid.

[Claim 115] This water solution is a false object object according to claim 88 or 89 characterized by being the water solution of sugar.
[Claim 116] This sugar is a false object object according to claim 115 characterized by being a cane sugar.
[Claim 117] This light-scattering object is a false object object according to claim 88 characterized by being floating fines.
[Claim 118] This light-scattering object is a false object object according to claim 88 characterized by being a colloidal particle.
[Claim 119] This light-scattering object is a false object object according to claim 117 or 118 characterized by being cerium oxide.
[Claim 120] This light-scattering object is a false object object according to claim 117 or 118 characterized by being titanium oxide.
[Claim 121] In the predetermined location in the moving trucking of the object by the migration means which carries two or more objects and carries them, and this migration means It is prepared a floodlighting means to floodlight light to an object, and near [said] the predetermined location, and has a light-receiving means to receive the light which carried out outgoing radiation of the object in said predetermined location. It is equipment which measures the internal quality of an object based on the light which carried out incidence to said light-receiving means. The internal quality measuring device of the object characterized by having the false object object according to claim 88 to 120 installed in said predetermined location at the time of amendment actuation, and amending internal quality measurement of an object using this false object object.
[Claim 122] The internal quality measuring device of the object according to claim 121 with which said false object is furthermore characterized by having a rise-and-fall means to make it go up and down said false object object between the downward location located in said predetermined location, and the rise location evacuated from said predetermined location.
[Claim 123] In the predetermined location in the moving trucking of the object by the migration means which carries two or more objects and carries them, and this migration means Counter a floodlighting means to floodlight light to an object, and said floodlighting means, and it is prepared. It has a light-receiving means to receive the light which carried out outgoing radiation of the object in said predetermined location. It is equipment which measures the internal quality of an object based on the light which carried out incidence to said light-receiving means. This equipment has two or more false object objects of a publication in either of the claims 88-120. The concentration of said water solution of two or more of said false object objects is the internal quality measuring device of an object given in the claim characterized by differing mutually and amending internal quality measurement of an object using these two or more false object objects.
[Claim 124] It is the internal quality measuring device of the object according to claim 123 which said two or more false object objects are installed on a revolver member pivotable to the circumference of a predetermined shaft, and is characterized by a false object object carrying out a sequential location between said floodlighting means and said light-receiving means by rotation of said revolver member at the time of amendment actuation of equipment.
[Claim 125] It is the internal quality measuring device of the object according to claim 124 which said revolver member has a through hole and is characterized by being projected on the light from said floodlighting means by the object through this through hole at the time of the usual measurement of those other than the time of said amendment actuation.
[Claim 126] A floodlighting means to be an interior quality measuring device of an object, and to floodlight light to an object, The support means which supports this object, and an observation means to observe the light which penetrated this object, The internal quality measuring device of the object characterized by having the amount control means of floodlighting which controls the amount of floodlighting according to the class of this object, and a position control means to control arrangement of said floodlighting means, said support means, and said observation means according to the magnitude

of this object.
[Claim 127] It is the internal quality measuring device of the object according to claim 126 which said amount control means of floodlighting has the gobo which has two or more stomata, and the gobo migration means to which said gobo is moved, and is characterized by for one of these the stomata being on the optical axis of said floodlighting means, and arranging it between said floodlighting means and these objects by said gobo migration means according to the magnitude of this object.
[Claim 128] It is the internal quality measuring device of the object according to claim 127 which a configuration is a rectangle, and, as for said gobo, these two or more stomata are prepared on the straight line of the arbitration within the field, and is characterized by said gobo moving with said gobo migration means in this straight-line top.
[Claim 129] It is the internal quality measuring device of the object according to claim 127 which the configuration of said gobo is circular, it is in the field, and these two or more stomata are prepared in the equidistant location from the core of this circle, and is characterized by said gobo revolving around this core with said gobo migration means.
[Claim 130] Said equipment has a conveyance means to carry out continuous [of the object] and to convey it, and a detection means to detect the diameter of this object. Said floodlighting means The internal quality measuring device of the object according to claim 126 characterized by floodlighting light on the outskirts of the equatorial section of the object this conveyed by controlling arrangement of said floodlighting means, said support means, and said observation means by said position control means based on the detection result by said detection means.
[Claim 131] The migration means to which it is an interior quality measuring device of an object, and the object laid at random is moved, In the object measuring device which is formed into the moving trucking of the object by this migration means, has an observation means to observe the light which floodlighted light to the object under migration and penetrated the object, and measures the internal quality of an object based on the output of this observation means An upstream detection means for it to be prepared in the upstream rather than said observation means of said moving trucking, and to detect the location of the object on said migration means, It is based on the output of the monitor means which acts as the monitor of the movement magnitude of said migration means, and a said upstream detection means and said monitor means. The internal quality measuring device of the object characterized by having the control means controlled to make observation by this observation means perform when said object on a migration means passes through the observation post of said observation means.
[Claim 132] It is the internal quality measuring device of the object according to claim 131 characterized by controlling to make observation by the observation means perform when said upstream detection means detects the transverse diameter of the migration direction of an object, said control means computes the center position of the migration direction of this object based on the detected transverse diameter and the core of this object passes through the observation post of an observation means.
[Claim 133] Furthermore, a downstream detection means for it to be prepared in the downstream rather than said observation means of said moving trucking, and to detect the location of the object on said migration means, The location on the migration means of a certain object detected by said upstream detection means is compared with the location on the migration means of the same object detected by said downstream detection means. The internal quality measuring device of an error judging means to judge with a measurement error when a gap is in both locations, and the object according to claim 131 or 132 characterized by having.
[Claim 134] Furthermore, a downstream detection means for it to be prepared in the downstream rather than said observation means of said moving trucking, and to detect the transverse diameter of the migration direction of said object, An error judging means to judge with a measurement error when the transverse diameter of the migration direction of the object detected by said upstream detection means is compared with the migration direction transverse diameter of the object detected by said downstream detection means and a gap is in both transverse diameter, The internal quality measuring device of the object according to claim 132 characterized by ****(ing).
[Claim 135] The internal quality measuring device of the object according to claim 134 characterized by

having further a classification means to classify into remeasurement the object judged by said error judging means to be an error.
[Claim 136] It is prepared into the moving trucking of the object by the migration means to which the object laid at random is moved, and this migration means. In the control approach of the interior quality measuring device of an object which has an observation means to observe the light which floodlighted light to the object under migration and penetrated the object, and measures the internal quality of an object based on the output of this observation means Set to the upstream rather than the object observation post by said observation means of said moving trucking, and the location of said object on said migration means is detected. Set to the downstream rather than the object observation post by said observation means of said moving trucking, and the location of said object on said migration means is detected. The control approach of the interior quality measuring device of an object characterized by judging with a measurement error when a gap is between the location detected by said upstream, and the location detected by said downstream.
[Claim 137] In the predetermined location in the moving trucking of the object by migration means to be an interior quality measuring device of an object, and to carry an object and to move, and this migration means The internal quality measuring device of the object characterized by evaluating the internal quality of an object based on the light which has a light-receiving means to receive the light which it was prepared above a floodlighting means to floodlight light from the side to an object, and the object in the above-mentioned predetermined location, and was penetrated from the object to the upper part, and carried out incidence to said light-receiving means.
[Claim 138] The internal quality measuring device of the object according to claim 137 characterized by having further the protection-from-light plate for shading so that the stray light may not go into said light-receiving means which is the side of the object in said predetermined location, and was prepared above the floodlighting location to the object top by said floodlighting means below the height of an object.
[Claim 139] Said floodlighting means and a protection-from-light plate are the internal quality measuring device of the object of publication 138 to the claim characterized by preparing in both sides on both sides of said migration means, and being able to adjust spacing between both protection-from-light plates.
[Claim 140] The internal quality measuring device of the object according to claim 139 characterized by furthermore having a transverse-diameter measurement means to be installed in the upstream rather than said predetermined location in said moving trucking, and to measure the transverse diameter of said object, and an accommodation means to adjust spacing of said protection-from-light plate based on the output of this transverse-diameter measurement means.
[Claim 141] Furthermore, the internal quality measuring device of the object according to claim 137 characterized by having the protection-from-light plate for shading so that the stray light may not go into said light-receiving means prepared above the height of the object in said predetermined location.
[Claim 142] Furthermore, the internal quality measuring device of the object according to claim 141 characterized by having a height measurement means to be installed in the upstream and to measure the height of said object rather than said predetermined location in said moving trucking, and an accommodation means to adjust the height of said protection-from-light plate based on the output of this height measurement means.
[Claim 143] Furthermore, a size measurement means to be installed in the upstream and to measure at least the height of said object, or one side of the transverse diameter rather than said predetermined location in said moving trucking, The protection-from-light plate which is a protection-from-light plate for shading so that the stray light may not go into said light-receiving means, is prepared near the object in said predetermined location, and can carry out a drive to the circumference of a predetermined horizontal axis, The internal quality measuring device of the object according to claim 137 characterized by having an accommodation means to adjust the angular position of the circumference of said horizontal axis of said protection-from-light plate so that the clearance between said protection-from-light plate and the object in said predetermined location may become small, based on the output of said

size measurement means.
[Claim 144] It is a protection-from-light plate for shading so that the stray light may not go into said light-receiving means. It is prepared near the object in said predetermined location, and a drive can be carried out to the circumference of a predetermined horizontal axis. When it is moved by said migration means and said object approaches said predetermined location, it is pushed up with this object and a drive is carried out to the circumference of said horizontal axis. The internal quality measuring device of the object according to claim 137 characterized by having further the protection-from-light plate which shades where this object is touched, when this object is in said predetermined location.
[Claim 145] The internal quality measuring device of the object according to claim 144 characterized by preparing the upward curling for permitting missing this protection-from-light plate upwards when an object is touched in the corner of the side which touches an object by said moving trucking upstream of said protection-from-light plate.
[Claim 146] It is the internal quality measuring device of the object according to claim 137 characterized by having opening which was able to be opened so that it might have further the tray for receiving said object fixed on said migration means, and this tray might have covered some received objects [at least] and the light from said floodlighting means might reach an object.
[Claim 147] A conveyance means to convey an object continuously, and a detection means to detect spacing of this object laid on said conveyance means, A floodlighting means to floodlight light to this object, and a light-receiving means to observe the light which penetrated this object, The 1st optical fiber which arranges one edge in the location which can direct receive the light by which outgoing radiation is carried out from said floodlighting means, connects the other-end section to said light-receiving means, and receives the light from said floodlighting means, without minding this object, A quantity of light adjustment means to adjust the quantity of light of the light which is prepared in the middle of the edge of said 1st optical fiber, or an optical path, and passes along said optical fiber, A 1st electric shielding means to cover the light which is prepared in the middle of the edge of said 1st optical fiber, or an optical path, and passes along said 1st optical fiber, The 2nd optical fiber which receives the light which has arranged in the location which can receive the light by which outgoing radiation is carried out from this object in one edge, connected the other-end section to said light-receiving means, and penetrated this object, A 2nd electric shielding means to cover the light which is prepared in the middle of the edge of said 2nd optical fiber, or an optical path, and passes along said 2nd optical fiber, Based on the detection result by said detection means, with the control means which controls actuation of said 1st electric shielding means and said 2nd electric shielding means, and said detection means While having judged that spacing of this object on said conveyance means is under a predetermined value Said control means covers said 1st optical fiber with said 1st electric shielding means, and the light which carried out incidence to said light-receiving means from said 2nd optical fiber is made to observe. With said detection means When it is judged that spacing of this object on said conveyance means is beyond a predetermined value Said 2nd optical fiber is covered with said 2nd electric shielding means. For said light-receiving means The observation by said light-receiving means when making the light which carried out incidence through said quantity of light adjustment means from said 1st optical fiber observe, and controlling the amount of incident light for the observation by said light-receiving means by said control means, The internal quality measuring device of the object characterized by having an operation means to amend based on the observation by said light-receiving means when covering incident light with said electric shielding means.
[Claim 148] Furthermore, the internal quality measuring device of the object according to claim 147 characterized by having an observation means to make the light which covered said 2nd optical fiber with said 2nd electric shielding means, and carried out incidence to said light-receiving means through said quantity of light adjustment means irrespective of the detection result by said detection means from said 1st optical fiber at the time of arbitration observe.
[Claim 149] When it is judged with said detection means that spacing of this object on said conveyance means is beyond a predetermined value Cover said 2nd optical fiber with said 2nd electric shielding means, and make the light which carried out incidence to said light-receiving means through said

quantity of light adjustment means from said 1st optical fiber observe, and said 1st optical fiber is further covered with said 1st electric shielding means after that. Said light-receiving means is made to observe, after said 1st optical fiber and said 2nd optical fiber have covered. Or said 1st optical fiber and said 2nd optical fiber are covered with said 1st electric shielding means and said 2nd electric shielding means. Make said light-receiving means observe, after said 1st optical fiber and said 2nd optical fiber have covered, and said 1st optical fiber is wide opened by opening the 1st electric shielding means of the account of back to front. The internal quality measuring device of the object according to claim 147 or 148 characterized by making the light which carried out incidence to said light-receiving means through said quantity of light adjustment means from said 1st optical fiber observe.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the equipment which measures the internal quality of the object of garden stuff etc. by un-destroying.
[0002]
[Description of the Prior Art] Conventionally, as equipment which measures the internal quality of garden stuff by un-destroying, there was equipment indicated by JP,6-213804,A, for example. Based on drawing 39 , conventional equipment is explained from drawing 37 below.
[0003] With the equipment shown in drawing 36 , light 854 is projected on the specimen objects (analyte) 852 which appeared in the band conveyor 850, such as a mandarin orange and an apple, from a lamp 853, and the light 856 which penetrated and carried out outgoing radiation of the specimen object 852 is received with a spectroscope 858. In a spectroscope 858, the absorption spectrum of the transmitted light 824 is measured and the internal quality of a specimen object can be known with this absorption spectrum. In this equipment, variation had arisen in measured value as two or more specimen objects 852 on a conveyor 850 were measured continuously. This is considered to originate in the base line (value used as the criteria of measurement) of the measured value of a spectroscope changing along with progress of the measuring time. This change has the large place depended on change of the environment of the circumference of it at a spectroscope and the equipment [itself] list.
[0004] Moreover, as equipment which measures the internal quality of garden stuff, such as a melon, by un-destroying, there was equipment indicated by JP,6-288903,A, for example conventionally. Based on drawing 38 , conventional equipment is explained below. With this equipment, near-infrared light is projected on the specimen objects 874, such as a melon which appeared in the protection-from-light bucket 872 on a band conveyor 870, from a lamp 876, and the light which penetrated and carried out outgoing radiation of the specimen object 874 is received with a spectroscope 880 through an optical fiber 878. In a spectroscope 880, the absorption spectrum of the transmitted light is measured and the internal quality of a specimen object 880 can be known with this absorption spectrum. In this equipment, variation had arisen in measured value as two or more specimen objects 874 carried in two or more one protection-from-light buckets 872 of every were measured continuously. This is considered to originate in the base line (value used as the criteria of measurement) of the measured value of a spectroscope 880 changing along with progress of the measuring time. This change has the large place depended on change of a spectroscope 880 and the environment of the circumference of it.
[0005] On the other hand, the light from the light source of a halogen lamp etc. was usually projected on garden stuff, the spectrum of the transmitted light was carried out to two or more channels from which wavelength differs with a spectroscope, the absorption spectrum of garden stuff was detected by changing and measuring the transmitted light reinforcement of each channel on a current in the internal quality measurement by such spectral analysis, and the sugar content of garden stuff etc. is measured based on it. such measurement -- setting -- one side -- fluctuation of a light source lamp, the fluctuation specifically accompanying environmental variations, such as change, degradation, and ambient

temperature, the time of the path of spectral characteristics (color temperature), etc. -- and-like at the time of the path of system of measurement again -- or the fluctuation accompanying an environmental variation etc. is not avoided but, thereby, an error arises in measurement.
[0006] In order to avoid this, by such measurement, equipment is proofread with a certain amount of time interval. Proofreading is performed by measuring the amount of transmitted lights of a predetermined proofreading object instead of the garden stuff which is original analyte. At a typical calibration procedure, it is Is about the transmitted light reinforcement (changed current reinforcement) of Ir and analyte garden stuff in transmitted light reinforcement [on each wavelength channel and as opposed to a proofreading object] (changed current reinforcement). It is proofreading by carrying out and calculating the measurement permeability value T as T = Is/Ir. That is, the value of the permeability of analyte is proofread by taking a ratio with the permeability of a proofreading object, and change of the transmitted light resulting from fluctuation of the light source or a measurement meter is canceled.
[0007] In addition, it is T =(Is-D)/(Ir-D), using the dark current of system of measurement in case the input to a spectroscope is zero about accuracy at a term ** sake as D more.
It may be alike and may calculate more.
[0008] As a proofreading object used for such proofreading, the flat absorption properties [, such as an ND filter (neutral densityfilter),] usually body is used. In order to make proofreading exact, because it is required to consider as the level on the strength [optical] near the transmitted light reinforcement of actual analyte, it lets an ND filter pass, without acting as the direct monitor of the light of the light source on the occasion of proofreading. Therefore, the permeability of the ND filter for proofreading is usually chosen so that the amount of transmitted lights may become predetermined within the limits to the amount of transmitted lights of actual analyte.
[0009] Moreover, to floodlight towards the core of garden stuff is desired in the equipment which measures the internal quality by the light which the value changed with locations in garden stuff, therefore the sugar content of garden stuff, acidity, the degree of ripeness, and other internal quality floodlighted light to garden stuff, and penetrated garden stuff. However, in the conventional example, since the height of the floodlighting light source was fixed, when the magnitude of analyte slack garden stuff differed, big analyte differed in the exposure location from small analyte. That is, to being floodlighted by the core of analyte in small analyte, it will be floodlighted by the lower part of analyte in big analyte, and it was not able to be said that it had measured on the same conditions to each analyte.
[0010] On the other hand, although the internal quality of garden stuff is measured in such a measuring device with the absorption-of-light spectrum which penetrated garden stuff, in order to measure correctly, it is desirable for an absorption spectrum to have sufficient reinforcement. However, the amount of the light which penetrates the garden stuff which irradiated the light of a constant rate may become very small depending on the class of garden stuff, and measurement becomes difficult in that case. That is, generally, a melon watermelon etc. has the small amount of transmitted lights, the amount of transmitted lights of a mandarin orange is large, and since the difference in the reinforcement of the absorption spectrum of each analyte cannot appear easily when measuring the internal quality of garden stuff with the small amount of transmitted lights, measurement by the absorption spectrum becomes difficult.
[0011] Moreover, light, such as a near infrared ray, is irradiated at garden stuff, and it measures one after another to two or more analytes, laying two or more garden stuff as analyte, and making it move onto transporters, such as a band conveyor, with the nondestructive measurement equipment of the garden stuff which measures internal quality, such as a sugar content of this garden stuff, and acidity, by measuring the absorption spectrum of the transmitted light in many cases. It measures, when the metering device which consists of a sensor for receiving the transmitted light from floodlighting equipment and analyte which floodlights light to analyte, and measuring an absorption spectrum is arranged in a certain location in the migration way of a conveyor and each analyte specifically passes through a measurement location in it. And based on the obtained absorption spectrum, a sugar content, acidity, etc. of garden stuff which are analyte are computed.
[0012] Furthermore, generally this kind of equipment is formed in the predetermined location in the

conveyance path by a migration means and migration means, such as a band conveyor to which two or more garden stuff is continuously moved in accordance with a conveyance path, and has the light source which irradiates light at the garden stuff on a migration means, and the photo sensor which receives the light which went via garden stuff as a main component.

[0013] Roughly divide the equipment known conventionally and a photo sensor is mostly formed in homotopic with the direction which irradiates light from the light source at 1 analyte garden stuff. The type which measures by receiving dispersion and the reflected light which intruded the interior several mm from the garden stuff front face (here, it is called a reflective mold), 2) The type which floodlights the light from the light source (usually one LGT) from the side to analyte garden stuff, arranges a photo sensor in the location which counters on both sides of garden stuff to said light source, and receives the transmitted light (here, it is called an opposite light-receiving mold), 3) Prepare the light source (in the cases of many many LGTs) in the side of the analyte garden stuff laid on the protection-from-light carrier (or bucket), and light is floodlighted from the side. The type (here, it is called a lower part light-receiving mold) which take out from the bottom through the hole which prepared in the carrier the transmitted light which were scattered about inside garden stuff and carried out outgoing radiation caudad, and the direction of light emitting/receiving is made to intersect perpendicularly with the photo sensor which garden stuff formed caudad, and receives light, and ******.

[0014] Among these, the class of garden stuff to which the equipment of a reflective mold fits measurement since only the internal quality information in Mr. about several mm Fukashi is obtained from the front face of analyte fruits is restricted. For extracting the internal quality information of the depth section of garden stuff, it is necessary to consider as the equipment using the upper transmission method of 2 or 3.

[0015]

[Problem(s) to be Solved by the Invention] However, with conventional equipment, since it was only performing adjustment (namely, calibration) of the base line which changes as the measuring time's passes at the time of measurement initiation, measurement progressed, and dispersion had arisen in measured value as time amount passed.

[0016] On the other hand, in order to have performed the calibration in the middle of measurement, Rhine had to be stopped to whenever [the], measurement had to be stopped, and the measuring time was long in order to perform a calibration. Moreover, with the equipment shown in drawing 37 , the internal quality of a specimen object 852 can be known like the equipment of drawing 36 by receiving the light 864 which projected the light 862 reflected with the half mirror 860 on the specimen object 852 which appeared in the band conveyor 850, reflected the specimen object 852, and passed the half mirror 860 with a spectroscope 858. In this equipment, a band conveyor 850 is inserted, the spectroscope 858 and the criteria reflecting plate 866 for proofreading can be made to be able to counter, and the reflected light from this reflecting plate 866 can perform a calibration in the part which does not have a specimen object on a conveyor 850.

[0017] However, the calibration by this approach is inapplicable to the equipment of drawing 36 which measures the light which penetrated the specimen object. Then, the purpose of this invention is by performing the calibration of equipment in the equipment which measures the internal quality of garden stuff by the light which penetrates a specimen object to eliminate fluctuation of the base line and offer the equipment which can measure the internal quality of garden stuff correctly, without interrupting measurement.

[0018] Moreover, as stated above, many fluctuation of a measuring device performs the proofreading which used proofreading objects, such as an ND filter. However, since the garden stuff which is actual analyte is using water as the principal component, the absorption property of an ND filter is flat to having a characteristic light absorption property. That is, since absorption properties differ greatly, in the flat absorption property of an ND filter, the large absorption property of change of garden stuff cannot be followed, but it becomes the value from which the transmitted light reinforcement of a proofreading object and the transmitted light reinforcement of analyte were widely different depending on wavelength, and there is a problem that high proofreading of precision cannot be performed.

[0019] Moreover, not only an equipment side but an analyte side has the fluctuation which poses a problem at the time of measurement by infrared spectroscopic analysis. That is, although based on absorption of specific wavelength producing the principle of internal quality measurement of the sugar content of garden stuff, acidity, etc. by infrared spectral analysis in a transmitted light spectrum by the various radicals (for example, functional groups, such as O-H and C-H) of the component matter of the garden stuff which is analyte, the absorption spectrum of garden stuff is changed by environmental variations, such as temperature, and fluctuation produces it also in the peak wavelength of absorption by the radical. For this reason, an error will appear in measurement of the internal quality by spectral analysis. This poses a problem especially in measurement of acidity with little content. An ND filter does not have the variability of the absorption property over such an environmental variation, but the ND filter as a proofreading object is inadequate also in this point. Furthermore, in the interior quality measuring device of garden stuff by the conventional spectral analysis, the location which measures a proofreading object within equipment differs from the location which measures analyte, and it has become the cause with which fluctuation of the absorption spectrum which this measured does not synchronize. This invention offers the amendment approach which solves such a problem.
[0020] Furthermore, in the measuring device which floodlights light to garden stuff and measures the internal quality of garden stuff by un-destroying, the purpose of this invention is not concerned with the magnitude of analyte, but enables it to irradiate light near the equatorial section (for it to be a field including the core of analyte and to be the crossing line on a field level on the surface of the earth, and the front face of analyte) of analyte, and is further to enable it to change the amount of floodlighting to garden stuff according to the class of garden stuff.
[0021] Moreover, in such a measuring device, in order to perform little measurement with error, it is desirable to measure in the center position of the garden stuff which is analyte. Since the location of the analyte on a conveyor is beforehand positioned by the position with the equipment of a configuration of preparing the bucket which receives each analyte and laying analyte on this bucket on a conveyor among this kind of equipment, it is easy to determine the timing of right measurement, i.e., the timing to which analyte passes through a measurement location. on the other hand, a band-conveyor top flat in the case of garden stuff with the need of measuring a lot of analytes, such as a mandarin orange, -- an automatic supply means etc. -- random -- analyte -- it is more useful on measurement effectiveness to lay and measure these garden stuff. However, when analyte is placed at random on the conveyor, when the core of a right measurement location, i.e., analyte, passes through a measurement location, in order to make it measure, a certain device is required. This invention offers the approach and equipment which enable such measurement.
[0022] Moreover, when garden stuff, such as a mandarin orange, is placed at random on a conveyor flat in this way, analyte may roll and move on the property of the configuration of the garden stuff near a globular form, and a conveyor. In that case, there is a problem whether measurement is received in a normal location and that the analyte which leaves a conveyor will become unknown. This invention also gives solution to such a problem.
[0023] Moreover, there are the following problems in the equipment using the conventional transmission method described above. Since a measuring beam will penetrate the transverse diameter of garden stuff in the case of the equipment of an opposite light-receiving mold, the optical path length becomes quite long. For this reason, when the specimen is a pile thing about light, such as an apple and a peach, through, there is a problem that the light which penetrates and carries out outgoing radiation of the specimen is very feeble, and a signal cannot be taken. the long wave which has spectrum absorption important for measurement of the interior quality of garden stuff especially -- like a long field -- a passage -- being hard -- things are also problems. In order to increase the amount of transmitted lights, it is possible to increase the floodlighting quantity of light, but since that floodlighting-on structure system is usually restricted to this opposite light-receiving type of case at one LGT, it is difficult to increase the floodlighting quantity of light.
[0024] On the other hand, in the case of the equipment of a lower part light-receiving mold, since light can be irradiated [of the side of analyte garden stuff] from plurality, by considering as the multi-LGT

type of two or more light sources, the floodlighting quantity of light can be increased, and when the transmitted light is lower part ejection, as compared with an opposite light-receiving mold, the optical path length inside garden stuff can be shortened. For this reason, in respect of the amount of transmitted lights, it is satisfactory, and can measure effectively also to the garden stuff which was not suitable for an opposite light-receiving mold.

[0025] However, in order to take out detection light from a lower part in the case of a lower part light-receiving mold, a hole must be made in a conveyor, using the carrier which made the hole, and there is a problem that the configuration of a conveyance system becomes complicated. Moreover, since alignment of the ********-ed must be carried out and it must be laid on the hole site of a conveyor, or a carrier, the feeder style for it is prepared or there is a problem that an operator has to do one garden stuff at a time every hand, at the time of measurement. Anyway, the measurement effectiveness of equipment will fall and it is a big problem as interior quality evaluation equipment of garden stuff with the continuous measurement of a lot of analytes being [much] required. Since a photo sensor must furthermore be formed in the lower part of a conveyor belt, i.e., the loop formation of a band conveyor, there is also a problem that the assembly of equipment and the time and effort of maintenance become complicated.

[0026]

[Means for Solving the Problem] In order [which solves an above-mentioned problem] to attain, this invention A conveyance means to be an interior quality measuring device of an object, and to convey an object continuously, By the light which a detection means to detect the location of the object laid on the conveyance means, a floodlighting means to floodlight a measuring beam to an object, a light-receiving means to receive the light which penetrated the object, and the light-receiving means received It is based on a signal from an analysis means to analyze the internal quality of an object, and a detection means. It has a reference object insertion means to insert the reference object which has a predetermined optical property into the optical path between a floodlighting means and a light-receiving means, and said analysis means compares the light which received light when a reference object was inserted with the reference data held beforehand, and aims at offering what amends an analysis result. Moreover, another purpose of this invention will become clear according to the following examples, referring to the attached drawing.

[0027]

[Example] The 1st example of this invention is explained based on drawing 1 - drawing 3 . As shown in drawing 1 , the equipment 1 of this example consists of a band conveyor 2, a sensor 4, and test-section 6 grade.

[0028] On a band conveyor 2, the specimen objects 8, such as a mandarin orange, arrange at the longitudinal direction A of the belt 3, it arranges, and a specimen object 8 is moved to the longitudinal direction A. In the middle of the migration direction A of a belt 3, the sensor 4 and the test section 6 are formed. A sensor 4 is a photoelectrical sensor and can acquire the existence, spacing, and positional information of a specimen object 8 on a band conveyor 2 by irradiating infrared light 10 on a band conveyor 2, and observing the reflected light. In the migration direction of a band conveyor 2, the test section 6 is located in the lower stream of a river of a sensor 4, irradiates light at a specimen object, and measures the internal quality of a specimen object from the outgoing radiation light from a specimen object.

[0029] A test section 6 consists of a lamp 12, the filter section 14, a spectroscope 16, a control section 18, and operation part 20 grade, as shown in drawing 2 . a lamp 12 -- a specimen object 8 -- it is arranged so that light can be mostly projected on the whole from the side face. It has the wavelength (650-950nm) of a near-infrared region, and after a part is absorbed inside the specimen object 8 with which it was projected on this light, as for the light 22 on which it is projected by the specimen object 8 from a lamp 12, outgoing radiation of the transmitted light 24 is carried out from a specimen object 8.

[0030] The filter section 14 is formed between the lamp 12 and the specimen object 8. The filter section 14 serves as the filter 30 which consists of ND filter 26 and the diffusion plate 28 as shown in drawing 3 from the calibration drive 32. The solenoid is being used for the calibration drive 32 and it can move a

filter 30 in the vertical direction B corresponding to the existence of the specimen object 8 in a test section 6.

[0031] The laminating of three ND filters 26a, 26b, and 26c and the diffusion plates 28 is carried out, and the flat surface of a filter 30 is perpendicular to the direction of radiation C of the light 22 from a lamp 12 to a specimen object 8. ND filter 26 is a filter of the neutral density (achromatic color) uniformly absorbed also to the wavelength light of incident light 22 throat, has the function to decrease the amount of transmitted lights, without changing the wavelength component of incident light, and is carrying out the laminating of three sorts of ND filters, 0.1% of transmission, 5%, and 20%, 26a, 26b, and 26c to the specimen object 8 side from the RAMBU 12 side in this example. The laminating of the diffusion plate 28 is carried out to the specimen object 8 side at ND filter26c of 20% of permeability arranged at the side nearest to a specimen object 8 among ND filters 26a, 26b, and 26c of three sheets. The diffusion plate 28 can carry out [diffuse reflection or] diffuse transmission of the incident light from ND filter 26, and outgoing radiation of the light of the uniform quantity of light is carried out over the whole surface. By having considered the filter 30 as such a configuration, the light from the light source can be decreased at a predetermined rate, and the base line of equipment 1 can be amended by measuring the quantity of light of this attenuation light.

[0032] The spectroscope 16 is formed on the production of the optical path of the light from a lamp 12 to a specimen object 8, and the light from a specimen object 8 or a filter 30 is received. It is possible for the absorption spectrum of the outgoing radiation light 24 from a specimen object 8 to be measured, and to measure internal quality, such as a sugar content of a specimen object 8, with this absorption spectrum in a spectroscope 16.

[0033] It has connected with a control section 18, and by the control section 18, the sensor 4 mentioned above changes into a current the quantity of light of the light which carries out incidence to the photoelectrical sensor 4 by photo electric conversion, by whether the current is larger than a predetermined value, it can distinguish the existence of the specimen object 8 in a test section 6, and, thereby, can detect spacing of the specimen object 8 on a conveyor 3. Furthermore, it connects with the calibration drive 32, and a control section 18 outputs the signal for driving this, and controls the drive of a filter 30.

[0034] The calibration drive 32 is detected as spacing of a specimen object 8 being beyond a predetermined value by the photoelectrical sensor 4, and if the part equivalent to spacing of the specimen object 8 enters in a test section 6, it will be driven so that a filter 30 may be arranged in the middle of the optical path from a lamp 12 to a specimen object 8. And the calibration of equipment 1 is performed in the condition of having arranged the filter 30 in this way. While being under a predetermined value in other than the above (i.e., spacing of a specimen object 8), the calibration drive 32 is driven so that a filter 30 may be evacuated from the optical path from a lamp 12 to a specimen object 8. In this way, since the calibration of equipment 1 can be performed at any time not only the time of measurement initiation but during measurement using the light which passed the filter 30, it is possible for it not to be influenced by fluctuation of the base line by measurement, but to be alike, and to measure the internal quality of garden stuff more correctly. In addition, the above-mentioned predetermined value is a value determined by the class of specimen object 8, magnitude, the reading per second, etc., and the user of equipment sets it up before measurement initiation or during measurement.

[0035] Operation part 20 is connected to the spectroscope 16, the current value of the frequency spectrum by the transmitted light 24 from a specimen object 8 and the current value by the calibration are inputted, and the internal quality of the specimen object 8 which eliminated the effect of fluctuation of the base line, the noise of a spectroscope 16, etc. becomes measurable based on these values.

[0036] When measuring the specimen object 8 put in order by the longitudinal direction A of the belt 3 of a band conveyor 2 by having considered as the above configuration, spacing of that specimen object 8 is detectable, and when this spacing is beyond a predetermined value, the calibration of equipment 1 can be performed. Therefore, not only before measurement initiation but after measurement initiation can perform a calibration at any time in a part without a specimen object 8, and measurement does not interrupt it for a calibration. Therefore, the internal quality of garden stuff can be correctly measured by

performing the calibration of equipment 1 every specimen object 8, without interrupting measurement.
[0037] The process of measurement of the internal quality of the garden stuff by this example is explained below. First, before starting measurement, measurement of the calibration of equipment 1 and a dark current is performed. In the condition that there is no specimen object 8 in a test section 6, a calibration arranges a filter 30 in front of a lamp 12 with the calibration drive 32, and performs it by measuring the quantity of light of the light irradiated by the spectroscope 16 through the filter 30 from the lamp 12. The quantity of light of this light is changed into a current value with a spectroscope 16, and serves as the base line (or reference value) of this measurement of a specimen object 8. On the other hand, measurement of a dark current is performed where the outdoor daylight included in a spectroscope 16 is intercepted entirely. This may be in the condition which could cover the light to a spectroscope 16 after the lamp 12 had lit up, and switched off the lamp 12. Equipment 1 the very thing in the condition of not going light into a spectroscope 16 has a dark current, and it can compute the current value which removed the effect of the noise of equipment etc. by deducting a dark current value from the measurement (current value which carried out photo electric conversion) by the next spectroscope 16.
[0038] Measurement of the internal quality of a specimen object 8 is performed when the specimen object 8 put in order and put on the longitudinal direction of the belt 3 of a band conveyor 2 reaches a test section 6 by migration of a belt 3, respectively. That is, if a specimen object 8 reaches a test section 6, direct light will be irradiated from a lamp 12 and the outgoing radiation light absorbed in part within the specimen object 8 will carry out incidence of the specimen object 8 to a spectroscope 16. The internal quality of a specimen object 8 can be measured with the frequency spectrum of this light. By the component contained in a specimen object 8, since a frequency with much quantity of light of light exists, this is because the configurations of frequency spectrum differ.
[0039] Continuation of measurement fluctuates the base line. This is based on environmental variations, such as a spectroscope 16, a test section 6, or temperature of the circumference of it, and in order to obtain a right measurement value, it must be made for the base line always to have to become fixed. In this example, the base line is measured in the part as for which predetermined spacing is vacant between specimen objects 8. This value is saved at the operation part 20 connected to the spectroscope 16.
[0040] After measurement of the calibration at the time of measurement initiation and a dark current is completed, it is evacuated from the optical path from a lamp 12 to a spectroscope 16, and a filter 30 carries out incidence of the light from a lamp 12 to a spectroscope 16 directly. If the specimen object 8 which appeared in the belt and has moved to the test section 6 of this condition reaches, the near-infrared light emitted from a lamp 12 is irradiated by the direct specimen object 8, and a part of that light will be absorbed by the specimen object 8, it will carry out outgoing radiation from a specimen object 8, and will carry out incidence to a spectroscope 16. And the internal quality of the specimen object 8 of a spectroscope 16 smell lever is measured.
[0041] Thus, whenever a specimen object 8 reaches a test section 6, the internal quality is measured one by one. If it is detected as spacing of a specimen object 8 being beyond a predetermined value by the photoelectrical sensor 4 during this measurement It judges that there is no specimen object 8 in a test section 6 in a control section 18, and the signal for a drive is outputted to the calibration drive 32. The solenoid of the calibration drive 32 operates in response to this signal, and a filter is moved and arranged in the optical path from a lamp 12 to a spectroscope 16.
[0042] The laminating of three ND filters and diffusion plates is carried out, and the filter 30 is carrying out the laminating of three sorts of ND filters, 0.1% of transmission, 5%, and 20%, 26a, 26b, and 26c to the specimen object 8 side from the RAMBU side as ND filter 26. That quantity of light decreases the light which carried out incidence to this filter 30 to about 0.001% with ND filters 26a, 26b, and 26c of three sheets. On the other hand, outgoing radiation of the light which the laminating of the diffusion plate 28 is carried out to the specimen object 8 side of ND filter 26c of 20% of permeability, and carried out incidence to this diffusion plate 28 is carried out in the diffused form. By having considered the filter 30 as such a configuration, the light from the light source can be decreased at a predetermined rate. The quantity of light of this decreased light is adjusted so that it may become the predetermined range to the quantity of light of the light which penetrated the specimen objects 8, such as a mandarin orange. That

is, it is supposed that ND filter 26 and the diffusion plate 28 which are used with the class of specimen object 8, magnitude, a lot, etc. will be changed. The base line of equipment 1 can be measured by measuring the quantity of light of attenuation light with this filter. The base line can follow the fluctuation at any time. The measured value of the base line is saved at operation part 20.

[0043] Here, the permeability shown below is used in evaluation of the internal quality of a specimen object 8. That is, the permeability T of each specimen object 8 (the i-th of the totals n) is expressed by the following formula by the measured value Si of the frequency spectrum by the outgoing radiation light absorbed in part within the specimen object 8, the average R of the current value by the calibration, and the dark current value D (dark current value).

$$Ti=(Si-D)/(R-D) \quad ... (1)$$

That is, the ratio of the outgoing radiation light from a specimen object 8 to the outgoing radiation light from the lamp 12 through a filter 30 is taken, and this is made into the permeability of a specimen object 8. Here, in each of a molecule and a denominator, the dark current value D is subtracted from the measured value Si of the frequency spectrum by outgoing radiation light, or the average R of the current value by the calibration. This has eliminated the noise of spectroscope 16 proper.

[0044] Deformation of this example is shown below. At this example, although the filter 30 was made a configuration called three ND filters 26a, 26b, and 26c and the diffusion plates 28, there is one number of sheets of an ND filter, and there may be more number of sheets. The permeability of the light of each ND filter may be a value different from this example. Instead of an ND filter, the filter of other classes which the permeability of light understands is also usable. A filter 30 may consist of only diffusion plates.

[0045] Although [the calibration drive 32] a filter 30 is arranged by moving a filter 30 in the vertical direction B in the middle of the optical path from a lamp 12 to a specimen object 8, its migration direction of a filter 30 is good in the directions of arbitration, such as a horizontal direction. Although the incidence of the light to the photoelectrical sensor 4 formed separately performed detection of a specimen object 8, it may be judged with the quantity of light of the incident light to a spectroscope 16. The existence of a specimen object 8 may be judged by the weight sensor formed in the belt 3.

[0046] projection of the light from a lamp 12 to a specimen object 8 -- a specimen object 8 -- if projection of light is almost possible to the whole, it is good even from not a side face but a top face etc. The light emitted from the photoelectrical sensor 4 may be the light of wavelength other than infrared light. The light emitted from a lamp 12 may be the light of wavelength other than near-infrared light. An optical fiber is sufficient as a lamp 12, and one LGT or two LGTs or more are sufficient as the number.

[0047] It continues, and it explains, referring to drawing 4 about the 2nd proofreading approach in this example. Drawing 4 is drawing showing the artificial garden stuff reference object (artificial garden stuff object) 40 as this example, and (a) is [a sectional view and (c of a perspective view and (b))] plans. This artificial garden stuff reference object 40 consists of a resin container 46 which height of 80mm and a base are one-side the rectangular parallelepipeds of the square it is [square] 65mm, and has formed glass 44 in the 2nd of those side faces 42, and a light transmission object 48 held into it. In addition, a container top face is covered and sealed with the lid 50 made of the resin of the same quality of the material as the resin container 46.

[0048] The resin container 46 and a lid 50 consist of what put graphite into polyethylene (PE) as a filler, and it has the property which penetrates light. As shown in drawing 4 (c), the thickness of the side face 42 of a container 46 differs those of d1 and d2 with two kind, and in respect of adjoining each other, and is the same in the field which counters. Heat-resistant glass 44 is formed in the 2nd page adjoined of the side faces 42 of the resin container 46 in parallel with the side face 42. This glass 44 of two sheets is the same configuration, and is formed, without making it stick through the air space 52 of almost uniform thickness to the side face 42 of the resin container 46 in the meantime. The 1st flange 54 and the 2nd flange 56 are formed in the upper limit and lower limit of a side face 42 of the resin container 46 along the ridgeline, respectively, and Crevices 54b and 56b are established in inferior-surface-of-tongue 54a of the 1st flange, and top-face 56a of the 2nd flange covering the overall length. Glass 44 is installed in the side face 42 of the resin container 46 by sliding horizontally and storing in both crevice 54b and 56b.

[0049] The light transmission object 48 selects the water solution of an acid, and the water solution of sugar suitably according to the class of garden stuff used as analyte. For example, as a water solution of an acid, a citric-acid water solution is used 1%. The artificial garden stuff object 40 equips the interior of the light transmission object 48 with the temperature detector (thermometry means) 58 using the thermistor for measuring the temperature of this light transmission object 48 etc.
[0050] Next, how to amend the measured value of the internal quality measuring device of garden stuff using this artificial garden stuff object 40 is explained. Drawing 5 is drawing showing the configuration of measuring-point 62 near [a garden stuff measuring device]. The measuring device has the band conveyor 60 and the analyte garden stuff (for example, mandarin orange) set on this band conveyor 60 is sent to a measuring point 62 one by one. In a measuring point 62, light is floodlighted by analyte with the floodlighting equipment 70 which consists of the light source 64, diaphragm 66, and a lens system 68. Incidence of the light which passed analyte is carried out to a photo sensor 72. The spectrum of the light which carried out incidence to the photo sensor 72 is carried out to two or more wavelength range channels, it performs spectral analysis by the approach of the common knowledge which investigates the absorbance for every channel, and computes the internal quality of analyte garden stuff, for example, acidity. Since this approach itself is well-known, explanation is omitted.
[0051] Equipment is equipped with the artificial garden stuff object 40, and according to the device in which it does not illustrate, in a measuring point 62, this artificial garden stuff object 40 goes up and down, as an arrow head D shows drawing 5 , and it can move now between the proofreading location 74 set between the floodlighting system and the photo sensor 72, and the normal positions 76 evacuated from there. Moreover, the artificial garden stuff object 40 is arranged so that it may become almost perpendicular to the optical axis 80 of the light 57 floodlighted from floodlighting equipment 70, and the outgoing radiation light 59 from an artificial garden stuff reference object in the 1st of the side faces 42 in which it was pivotable and glass 44 was formed centering on the shaft 78 of the direction of a vertical passing through the core of the base.
[0052] The result of having measured the artificial garden stuff object 40 of this example and the acidity of fruits with the passage of time to drawing 6 is shown. As this drawing shows, it turns out that the acidity (value computed from the absorbance) of the artificial garden stuff object 40 measured in the same environment as acidity measurement of fruits is carrying out time amount change almost synchronizing with the acidity of fruits, and fixed correspondence relation among both is.
[0053] Spectrum absorption of the garden stuff in a near-infrared region originates in functional groups, such as O-H and C-H, and measurement of internal quality, such as acidity of the garden stuff by spectral analysis, is performed based on the absorption spectrum by these functional groups. This absorption property is changed by environmental variations, such as temperature and humidity. In the artificial garden stuff object 40 of this example, since the acid (citric acid) water solution is constituted for the transparency object as the base and the same functional group is included, synchronizing with the garden stuff which is actual analyte, it also comes to change the absorption property of the artificial garden stuff object 40. Thereby, fluctuation of the spectrum absorption by the environmental variation can be amended. An example of the amendment approach of the interior quality measurement of garden stuff using this reference object is explained below taking the case of measurement of acidity.
[0054] It asks for the relation nature (namely, slope-of-a-line S which connects six points in drawing 7 in approximation) of the fluctuation accompanying the environmental variation of the acidity measured value between the artificial garden stuff reference object 40 and real garden stuff beforehand first. The acidity measured value DR of artificial garden stuff in the condition (namely, condition that right measured value is obtained (environment)) that acidity of actual garden stuff is measured without error on the other hand (calculation) is calculated as a criteria acidity value. In other words, in the criteria acidity value DR, when the acidity value which measured and obtained the acidity of artificial garden stuff by a certain environment condition is DR, the measurement acidity of the real garden stuff obtained in the condition is the value that the right acidity value will be given without amendment (with correction value zero). A "right acidity value" means the value which is not by spectral analysis and asked for the acid concentration of the real garden stuff concerned by chemical analysis here. Therefore,

the value of DR is calculated using the real garden stuff which has the known acidity for which it asked by chemical analysis. The relation nature (slope-of-a-line S) and the criteria acidity value DR of the above fluctuation are calculated beforehand, and the processor of a measuring device is made to memorize them as data.

[0055] Amendment actuation at the time of actual measurement is performed 2 hours of predetermined time, every [for example,]. At the time of amendment actuation, the artificial garden stuff object 40 of drawing 5 is first taken down to the proofreading location between a floodlighting system and a photo sensor 72, the measurement same about the artificial garden stuff object 40 as usual real garden stuff is performed, and an acidity value is computed. Supposing this observation acidity value is D, correction value C will be calculated by the following formulas.

C =(DR-D) xS -- by adding the correction value acquired in this way to the measured value of each garden stuff which is actual analyte, measured value is amended and approach the right acidity value which is not influenced by the environmental condition.

[0056] For example, suppose that slope-of-a-line S which the value of DR is 1.0% and connects many points of drawing 7 in approximation was beforehand called for as 0.9. And suppose that the acidity of the artificial garden stuff measured at the time of amendment actuation was 1.2%. In this case, it is in the condition out of which the error has come to the plus side by the environmental variation (that is, measured value has actually come out highly more). In this case, correction value C is calculated with C =(1.0-1.2) x0.9 =-0.18. What (that is, 0.18 is subtracted) is added to the measured value which acquired this correction value "-0.18" to analyte garden stuff amends.

[0057] Although amendment actuation is performed at intervals of predetermined time during a measurement period as mentioned above since an environmental condition changes every moment When performing amendment actuation every 2 hours, for example, the applicability of correction value 1) It is possible to apply to the measurement data which applies the correction value acquired [which applies the acquired correction value to the measurement data of the past 2 hours] two to the measurement data obtained in the following 2 hours and which acquired the correction value acquired three by a unit of 1 hour approximately [the] etc. Although the way of 3 is the most desirable as effectiveness of amendment, it is not restricted to this. Moreover, the more spacing which performs amendment actuation is short, since the imitation nature to an environmental variation increases, the more amendment precision goes up, but since original measurement is interrupted at the time of measurement of the artificial garden stuff for amendment and the throughput of measurement falls, in consideration of them, it is set as suitable time amount. Moreover, enlarging spacing will also be considered, if it turns on the light source 64, and amendment actuation is performed and it is stabilized in a short time interval, since stability is low for the time being.

[0058] The artificial garden stuff reference object 40 of this example equips the interior of the light transmission object 48 with the temperature detector 58 for measuring the temperature of this light transmission object 48. This is for amending a temperature gradient with the garden stuff which is the artificial garden stuff object 40 and actual analyte. That is, garden stuff, such as a mandarin orange which is the object of measurement, is supplied from predetermined storage to what is attached in equipment in many cases like the example of equipment which showed the artificial garden stuff object 40 to drawing 5 . If both are in a common environment, it is satisfactory, but when a temperature gradient is among them, it is desirable to carry out temperature compensation. Then, the artificial garden stuff object 40 of an example is equipped with a temperature detector 58, acts as the monitor of the temperature of a transparency object, and in case it calculates the above-mentioned correction value based on this monitor result, it performs amendment in consideration of temperature conditions further.

[0059] In this example, the resin container 46 which constitutes the artificial garden stuff object 40 can penetrate light, and the amount of transparency changes with the thickness. Thus, in the constituted artificial garden stuff object 40, the amount of the light by which outgoing radiation is carried out from the container side face 42 which floodlights almost at right angles to the container side face 42, and counters becomes what changed with thickness of a side face 42. That is, when the light of the same quantity of light as two side faces in which thickness differs is floodlighted, there are few amounts of the

light which penetrates a thick side face, and its permeability of light is lower [the thick side face] than the amount of the light which penetrates a thin side face. In this example, it is changeable into the field which has permeability which is different in the field floodlighted by rotating the artificial garden stuff object 40 according to the class of analyte, modification of a lot or an environmental change, etc. using this property. As stated above, according to this invention, it becomes possible to choose the artificial garden stuff object 40 according to modification of analyte without modification of a floodlighting system and a light-receiving system.

[0060] Moreover, since heat-resistant glass 44 is formed in the side face 42 in which floodlighting to the artificial garden stuff reference object 40 is performed among the side faces 42 of the resin container 46, compared with the case where there is no glass 44, the artificial garden stuff reference object 40 has high endurance to heating by floodlighting. Furthermore, since an air space exists between glass 44 and a side face 42, even if the artificial garden stuff reference object 40 is heated by floodlighting, it becomes easy to radiate heat, and endurance improves further. Moreover, since it slides horizontally and glass 44 can be removed, when the thermal resistance of glass 44 falls, always sufficient thermal resistance can be secured by exchanging glass 44.

[0061] This example is instantiation and this invention is not limited to this. That is, the containers of the artificial garden stuff object 40 may be polyfluoroethylene (PFE) and glass 44 instead of polyethylene (PE). A heat-resistant ND filter may be used instead of the glass 44 formed in resin container 46 side face 42.

[0062] In this example, although glass 44 was formed in the 2nd of the 424th page of the side faces of the resin container 46, the fields in which glass 44 is formed may be the 1st page, the 3rd page, and the 4th page (whole surface). Although the thickness of the side face 42 of the resin container 46 is the same in the field which counters, arbitration is sufficient as the combination of the thickness of four side faces 42. By the thickness of arbitration, the air space 52 between the side face 42 of the resin container 46 and glass 44 may be good, and there may be. [no]

[0063] The base of the configuration of the artificial garden stuff reference object 40 may be not a rectangular parallelepiped but a square multiple column and a square cylinder. The light transmission object 48 mixes cerium oxide of 0.3 micrometers of **** as a light-scattering object to the gel matter, for example, 1% citric-acid water solution, and homogeneity is made to diffuse it, and it may gel it by polyacrylamide gel.

[0064] In this example, although the artificial garden stuff object 40 goes up and down in a measuring point 62, it is good also considering the artificial garden stuff object 40 as the upper part of a measuring point 62, or fixing caudad, and going up or dropping floodlighting equipment 70 and a photo sensor 72 in one in the case of proofreading. A counterclockwise rotation is sufficient as rotation of the artificial garden stuff object 40. The artificial garden stuff object 40 is almost perpendicular to the optical axis of the light which replaces with the shaft 78 of the direction of a vertical passing through the core of the base, and is floodlighted from floodlighting equipment 70, and good also as rotating centering on the horizontal shaft passing through the core of a side face 42. In this case, it is desirable to change the thickness of a side face, a top face, or a base, and to form heat-resisting glass in each by the above-mentioned approach. If rotation of artificial garden stuff 40 is the shaft of the direction of a vertical, it does not need to pass along the core of the base of a container 46.

[0065] On the other hand, in this invention, it cannot be concerned with the magnitude of analyte but the internal quality can be measured on the same conditions. A detail is explained below. Drawing 8 is the outline block diagram of the equipment concerning this example. Explanation is omitted about the already explained proofreading part. The floodlighting optical system 70 and a spectroscope 72 can be gone up and down in the direction of a vertical shown by arrow heads F and G, respectively, and at the time of measurement of analyte 88, they make in agreement the optical axis 80 of the floodlighting optical system 70, and the optical axis 94 of the light-receiving lens 92 of a spectroscope 72, and by making it go up and down these, they are arranged so that the equatorial section 90 of analyte 88 may be located on these opticals axis.

[0066] the floodlighting optical system 70 -- a lamp 64 -- it extracts and consists of 66 and a lens 68.

From a lamp 64, light 96 is floodlighted towards analyte 88, and the light 96 was perpendicularly formed between the lamp 64 and the band conveyor 60 at the optical axis 80 of floodlighting optical system, extracts, and is irradiated by analyte 88 through 66 and a lens 68. It extracts and 66 is the structure where the aperture of opening 100 changes continuously, concentrically, it passes along the opening 100 opened by predetermined magnitude according to the class of analyte 88, it is moderately condensed with a lens 68, and the light 96 emitted from the lamp 64 is irradiated by analyte 88 focusing on the equatorial section 90. Moreover, rise and fall of the floodlighting optical system 70 are enabled as one. By this configuration, according to the magnitude of analyte 88, the height of the whole equipment is changeable, and since the equatorial section 90 of analyte 88 is not concerned with the magnitude of analyte 88 but is always on the production of the optical axis 94 of the light-receiving lens 92 of a spectroscope 72, the exposure of it in light 96 is always attained towards the equatorial section of analyte 88.

[0067] Namely, since the floodlighting optical system 70 and a spectroscope 72 go up as a dotted line shows also when measuring about big analyte 88b, It is not concerned with the magnitude of analyte, but light is irradiated focusing on equatorial section 90of analyte 88b b, and in order to receive the outgoing radiation light from the part centering on equatorial section 90b, it always becomes possible to measure the internal quality of each analyte on the same conditions.

[0068] Next, the floodlighting optical system 70 extracts and 66 is explained. Drawing 9 is the perspective view having shown the configuration of the floodlighting optical system 70. In this example, it extracts and 66 has the opening 100 which changes to concentric circular continuously. When the light of the fixed amount of floodlighting is floodlighted from the lamp 64 which was extracted and has been arranged at the tooth back of 66, from opening 100, the light of the quantity of light proportional to the aperture extracts, and outgoing radiation is carried out from 66 transverse planes.

[0069] A setup of the aperture of opening 100 is performed based on the class of garden stuff which is analyte 88. That is, in measuring the internal quality of the garden stuff which is easy to penetrate light, aperture of opening 100 is made small and it makes small the amount of floodlighting to analyte 88. On the other hand, in the case of the garden stuff which cannot penetrate light easily, aperture of opening 100 is enlarged and the amount of floodlighting to analyte 88 is enlarged. Thus, by setting up aperture according to the class of analyte 88, and changing the quantity of light which irradiates analyte 88, the quantity of light by the class of analyte 88 by which outgoing radiation is carried out from a specimen object 8 ** can be carried out to more than constant value, thereby, it cannot be based on the class of specimen object 8, but can be alike, and the internal quality of garden stuff can be measured more correctly.

[0070] The example of measurement of this example is shown below. Here, the explanation about the already described calibration and proofreading is omitted. First, the internal quality of the mandarin orange which is easy to penetrate light is measured. It extracts and the opening 100 of 66 is set as the minimum aperture. In this case, although the amount of floodlighting to analyte 88 is small, since the quantity of light by which outgoing radiation is carried out from analyte 88 is sufficiently large, it can measure the internal quality of analyte 88 with this absorption spectrum.

[0071] First, analyte 88 is carried on the band conveyor 60 for measurement. And while making it go up and down the floodlighting optical system 70 and a spectroscope 72 and making these opticals axis 80 and 94 in agreement according to the magnitude of analyte 88, it is made for the equatorial section 90 of analyte 88 to be located on these opticals axis 80 and 94. In this condition, from a lamp 64, light is turned to analyte 88 and floodlighted. The light 96 emitted from the lamp 64 extracts, passes along the opening 100 of 66, and it carries out incidence to a lens 68. The light moderately condensed with the lens 68 is irradiated by analyte 88 focusing on the equatorial section 90. After setting a front face and inside analyte 88 and reflecting and absorbing the part, outgoing radiation of the light irradiated by analyte 88 is carried out, and it is received by the spectroscope 72.

[0072] As for the light received by the spectroscope 72, the absorption spectrum is measured. An absorption spectrum changes with each analytes 88, and, thereby, can measure the internal quality of each analyte 88. Next, the internal quality of the apple which cannot penetrate light easily is measured. It

extracts and the opening 100 of 66 is set as the greatest aperture. In this case, since the amount of floodlighting to analyte 88 is large, the quantity of light by which outgoing radiation is carried out from analyte 88 is large enough, and can measure the internal quality of analyte 88 with this absorption spectrum. Measuring conditions other than this are the same as that of the case where analyte is a mandarin orange, and can measure the internal quality of analyte 88 with the outgoing radiation absorption-of-light spectrum from analyte 88.

[0073] The modification of this example is shown below. Although carried out to your making it go up and down the floodlighting optical system 70 and a spectroscope 72 although the optical axis 80 of the floodlighting optical system 70, the optical axis 94 of the light-receiving lens 92, and the equatorial section 90 of analyte are made in agreement, you may make it go up and down the location of a band conveyor 60 in which analyte 88 was carried in this example. Moreover, it is good also as changing the floodlighting location to analyte 88 by preparing a mirror into the floodlighting optical system 70, and changing the include angle of this mirror. Furthermore, you may make it always receive the outgoing radiation light from the equatorial section 90 of analyte 88 by preparing a mirror between the light-receiving lens 92 of a spectroscope 72, and analyte 88, and changing the include angle of this mirror.

[0074] Although [opening 100] it changes to concentric circular, as long as the quantity of light which extracts and passes 66 is controllable, it may be the aperture of other configurations. Moreover, the time amount to which opening is opening it, seting the configuration of opening as constant may be controlled. Moreover, a filter may perform.

[0075] It sets to this invention and the location of the analyte on a migration means can be detected, and when analyte is in a measurement location surely, it can measure. The detail is explained below. Drawing 10 and drawing 11 are drawings which explain notionally the outline of the sugar content acidity measuring device of this example, respectively, drawing 10 is a plan and drawing 11 is a side elevation.

[0076] In drawing 10 , the band conveyor 60 is moving rightward in the direction J of an arrow head of drawing, i.e., drawing. The mandarin orange m which is analyte is laid at random on this band conveyor 60. In drawing 10 , six mandarin oranges m appear on the conveyor 60. A conveyor is inserted into the maximum upstream of a band conveyor 60, and the 1st photoelectrical sensor 102 constituted by the pair of floodlighting component 102a, such as a photodiode, and photo detector 102b is arranged. Floodlighting component 102a is injecting detection light towards photo detector 102b. Photo detector 102b receives this and outputs it to CPU120 (central-process unit: drawing 12 R> 2) which changes into an electrical signal and is mentioned later.

[0077] A conveyor is similarly inserted into the lowest style side of a band conveyor, and the 2nd photoelectrical sensor 103 constituted by the pair of floodlighting component 103a, such as a photodiode, and photo detector 103b is arranged. By the 2nd photoelectrical sensor 103 as well as the case of the 1st photoelectrical sensor 102, floodlighting component 103a is injecting detection light towards photo detector 103b, and photo detector 103b receives this, changes it into an electrical signal, and is outputted to CPU120.

[0078] The measurement system for actually performing this measurement of the sugar content and acidity of analyte is arranged by the upper approach in the middle of a band conveyor. This measurement system consists of light source 110a which emits light including a near-infrared region, and spectroscope 110b which receives the light which penetrated Analyte m. The spectrum of the light which received light is carried out, it decomposes into two or more frequency components, and spectroscope 110b outputs the signal according to each component luminous intensity to CPU120. Since it is well-known about the detail of this measurement, explanation is omitted here.

[0079] Although the dimension of each part is determined as arbitration according to a situation and conditions in the above configuration, in this example, as a suitable example, distance between the 1st and 2nd photoelectrical sensors which met in the migration direction of a band conveyor is set to 800mm, and sets the core (location shown with the alternate long and short dash line X0 of drawing) of a measurement system as the location of 350mm from the first photoelectrical sensor. Moreover, let passing speed of a band conveyor 60 be 300 - 1000 mm/sec extent. Many above numeric values are

shown as an example, and this invention is not limited to this.
[0080] Then, reference of drawing 11 twists the conveyor belt 60 around two rollers 111 and 112. It connects with the non-illustrated source of power, and the roller 112 of the downstream rotates to the sense (clockwise rotation) of the arrow head of drawing, and drives a belt 60. Revolving-shaft 112a of the downstream roller 112 is connected to the roller 112 through revolving-shaft 113a of an encoder 113 and the belt 114 which were adjoined and prepared. Thereby, an encoder 113 is interlocked with migration of a band conveyor 60, and is rotated. An encoder 113 outputs the pulse signal according to the rotation, and in this example, it sets it up so that an encoder output may serve as one pulse to 0.1mm of migration length of a band conveyor. The monitor of the movement magnitude of a band conveyor 60 can be carried out by this counting the number of output pulses of an encoder 113.
[0081] Then, actuation of the equipment of this example is explained. A block diagram shows the rough configuration of the control system of this equipment to drawing 12 first. As explained above, each output of the 1st photoelectrical sensor 102, the 2nd photoelectrical sensor 103, the sensor 110 for this measurement, and an encoder 113 is connected to the equipment CPU 120 which controls actuation of the whole equipment. CPU120 is used as information for carrying out digital conversion of the inputted signal if needed, and controlling actuation of equipment. Moreover, the collection classification equipment 115 of analyte is elsewhere connected to CPU120. This collection classification equipment 115 is equipment which is arranged in the lower stream of a river of a band conveyor 60, and collects the analytes which came out of the band conveyor 60, and is classified if needed. Analyte according to a measurement result is classified according to directions of CPU120 so that it may explain later.
[0082] Actual measurement is performed as follows. Driving a band conveyor 60 with constant speed, in the upper edge of a conveyor 60, Analyte m (here mandarin orange) is supplied one after another with an analyte supply means by which it does not illustrate, and it lays at random on the band conveyor 60. "Random" means laying at random here, without adjusting distance between positioning or analyte especially, or preparing a partition on a conveyor.
[0083] Light emitting device 102a of the 1st photoelectrical sensor is generating the light of fixed reinforcement towards photo detector 102b in the measurement working usual state of equipment. When there is nothing that nothing interrupts among both components, photo detector 102b always receives the light of fixed reinforcement, therefore the output signal of the 1st photoelectrical sensor serves as fixed level (high level H). Analyte is supplied on a conveyor 60 from a band-conveyor upstream edge, and when it is moved to the downstream with the drive of a conveyor 60 and puts in the 1st photoelectrical sensor location, Analyte m will interrupt the beam of light which goes to photo detector 102b from light emitting device 102a. While this analyte m passes through the 1st photoelectrical sensor location, light does not go into photo detector 102b, therefore the output signal of the 1st photoelectrical sensor serves as a low level L lower than the period aforementioned high level H according to the width of face of Analyte m. In this way, the output signal of the 1st photoelectrical sensor serves as the rectangle-like signal wave form where Analyte m included the information which shows the time amount which passed through the location of this sensor. An example of this photoelectrical sensor output signal wave is shown in drawing 13 . drawing 13 -- m1 from -- m3 ****** -- three shown low-level parts show that three analytes passed through the 1st photoelectrical sensor location.
[0084] As stated above, the pulse signal which shows the movement magnitude of the band conveyor 60 outputted from the encoder 113 is also inputted into CPU120. The passage data of the analyte m obtained based on the above-mentioned 1st photoelectrical sensor output signal by using this pulse signal are convertible for the size and positional information of analyte. That is, it is the low-level part m3 of a signal, for example at drawing 13 . Both ends T1 and T2 are analyte m3, respectively. It is analyte m3 by subtracting the number of encoder pulse counts in both the time of day T1 and T2, although it corresponds to the passage initiation at the time of passing through the 1st photoelectrical sensor location, and end time. The transverse diameter can be obtained. For example, T1 The number of pulse counts which can be set isT2 at 61400. Supposing the number of pulse counts which can be set is 62000, it is analyte m3. A pulse number while passing through a photoelectrical sensor location is 62000-61400=600. Moreover, as mentioned above, since it is set up so that it may become one pulse for

every 0.1mm migration (namely, 0.1 [mm/pulse]), an encoder 113 is analyte m3. Transverse diameter can be recognized to be mm/600 [pulse] x0.1 [pulse] =60mm. Moreover, by counting the number of encoder pulses after analyte leaves the 1st photoelectrical sensor location, the positional information of analyte can also always obtain CPU.

[0085] CPU120 computes the center position of this analyte about the core, i.e., migration direction, of the transverse diameter from the size (transverse diameter) information on each analyte m obtained as mentioned above. CPU120 is based on the center position computed further and the movement magnitude information acquired from an encoder pulse signal, and the core of Analyte m is this measurement location X0. It asks for the passing timing and controls to perform this measurement of a sugar content and/or acidity in accordance with it.

[0086] This equipment has the 2nd photoelectrical sensor near the lowest style edge of a band conveyor further. This 2nd photoelectrical sensor measures the transverse diameter and location of analyte like the 1st photoelectrical sensor, it is comparing with the data obtained by the 1st photoelectrical sensor to the same analyte, and it is formed in order to detect whether the location gap came in the middle of migration on the band conveyor. By the same processing as the 1st photoelectrical sensor signal, transverse-diameter information and center position information are specifically acquired. Since there is no guarantee to which this measurement was carried out in the right location when a gap is in either [the transverse diameter and center position to the same analyte obtained from the 1st photoelectrical sensor signal / respectively] Delivery and collection classification equipment classify the analyte corresponding to an error signal for an error signal into the collection classification equipment 115 with which CPU120 was formed in the downstream of a band conveyor at the analyte for remeasurement.

[0087] Actuation of CPU120 in the process explained above is shown in the flow chart of drawing 14 . In the actuation shown in the flow chart of drawing 14 , it detects [which starts measurement] whether it was not rich and analyte passed the 1st photoelectrical sensor in step S1. It stands by until passage is detected here, and if detected, it will progress to step S2. At step S2, the passage data (pulse data) of the analyte based on the signal acquired from the 1st photoelectrical sensor and the pulse signal of an encoder are read.

[0088] Then, based on pulse data, the passage data of analyte are changed into transverse-diameter data (mm unit) at step S3. Next, it judges whether in step S4, the transverse diameter is in a normal range. Since two or more analytes approach and the transverse diameter is considered to be 1 relation across a normal range, when large, and it cannot pinpoint the center position of each analyte in that case and measurement is impossible, it progresses to step 22 and considers as an error. If judged with the measurable range by step S4, it will progress to step S5, and the processing to the normal transverse diameter is started.

[0089] In step S6, this measurement location as a center position of the transverse diameter is computed. This measurement location obtained at step 6 in step S7 is once saved as array information on the analyte in a measurement waiting state. In step S8, it judges whether there is any non-measured analyte where the waiting array information for measurement is saved. It stands by until in other words it will be in the condition that the waiting array information for measurement is acquired. If judged with there being analyte which is in a measurement waiting state at step S8, the waiting array information for measurement will be read in S9.

[0090] Then, it stands by until this measurement of the amount of analyte transmitted lights for a sugar content and acidity measurement is completed in step S10. If measurement is completed, a sugar content and acidity will be calculated based on the measurement result obtained at step S10 by step S11, and it relates with location data and saves.

[0091] It stands by that analyte passes the 2nd photoelectrical sensor of a down-stream edge in step S12 after that. If passage is detected in step S12, the passage data of the analyte based on the signal acquired from the 2nd photoelectrical sensor in step S13 will be read.

[0092] Then, in step S14, the location and transverse-diameter data of analyte when passing the 1st photoelectrical sensor of the data which serve as a degree in sequence out of the data which the sugar content acidity operation has ended are read. And in step S15, location data when the analyte which is

equivalent to these data based on the distance between the 1st and 2nd photoelectrical sensors passes the 1st photoelectrical sensor from the location data in the 2nd photoelectrical sensor read by S13 are computed. the time of subtracting the distance between both sensors from the location data based on this, i.e., the 2nd photoelectrical sensor, and the analyte concerned going back, and passing the 1st photoelectrical sensor -- what kind of location -- it must have been -- it asks.

[0093] Then, the location in the 1st photoelectrical sensor for which it asked from the location in the 2nd photoelectrical sensor for which it asked by S15 in step S16 (II), The actual location (I) in the 1st photoelectrical sensor read by S14 is compared. When the location (II) for which it asked by S15 from the location (I) read by S14 is shifted to the upstream more than the specified quantity (when too late), Since analyte is considered to have dropped out of the conveyor in the path from the 1st photoelectrical sensor to the 2nd photoelectrical sensor An error signal is continuously deleted the reading data in step S14 which progressed and corresponds and generated to step S20 in S21 as abnormalities, it returns to S14 again, and the data in the following 1st photoelectrical sensor are read.

[0094] When a gap in the upstream of a location (II) is below the specified quantity to a location (I) in the location comparison of step S16 (not too late), it progresses to step S17 as normal, and judges whether the location (II) is shifted to the downstream more than the specified quantity to the location (I) this time. Since there is no guarantee to which it was thought that analyte caused the location gap on the conveyor, and this measurement was carried out in the right measurement location when shifted to the downstream more than the specified quantity (when too early), it progresses to step S22 as abnormalities, and considers as an error.

[0095] When a gap in the downstream is below the specified quantity at step S17, it progresses to step S18 as normal. At step S18, the transverse diameter of the analyte obtained from the passage data of the 2nd photoelectrical sensor judges whether it is in agreement with the transverse diameter obtained from the data of the 1st photoelectrical sensor before this measurement read by S14. Since it is considered a gap (namely, when having caused posture change of being stood from the condition of having moved and slept on the conveyor by the mandarin orange which is analyte etc.) of the installation direction of the analyte in an intermediate process, or the identification error of analyte when [unusual] not in agreement [case namely,], it progresses to step S22 and considers as an error.

[0096] When a judgment at step S18 is normal, it progresses to step S19, and it judges whether measurement of the sugar content and acidity about the analyte concerned is completion ending. When measurement is not performed, it progresses to step S22 and considers as an error. When judged with finishing [measurement] at step 19, there is no problem in a measurement process, it judges that right measurement was performed, and a measurement process is ended.

[0097] Steps S21 and S22 are steps when various abnormalities are judged at many above-mentioned judgment steps, and CPU outputs an error signal to collection classification equipment, and they order it it so that it may classify into the category of the analyte to which this collection classification equipment measures the analyte concerned again.

[0098] Although it was based on the example above and this invention was explained, this example is a thing for instantiation, this invention is not limited to many elements of an example, and various deformation is possible for it. For example, although this example has an analyte supply means in the upstream of a band conveyor and automatic supply of the analyte is carried out, analyte may be separately laid on a conveyor by handicraft. By the collision of a peach etc., when analytes are a pain and cone garden stuff, they actually lay by hand in many cases.

[0099] Moreover, although the mandarin orange is targetted for the equipment of this example, this invention is applicable to various equipments which measure during migration not only to other garden stuff or garden stuff but a certain analyte set on the migration means. Moreover, although a sugar content and acidity are measured with the equipment of this example, of course, it is applicable also to measurement of the internal quality of others of garden stuff.

[0100] Next, the 2nd example of this invention is explained based on drawing 15 . Here, explanation is omitted about the same configuration as the 1st example, and only a different part is explained. Namely, the shutter 34 of a closing motion type is formed in the light-receiving lens of a spectroscope 16, closing

motion is controlled by the shutter drive 36 using a solenoid, and a shutter moves in the vertical direction K.

[0101] It connects with the calibration drive 32 and the shutter drive 36, and a control section 18 outputs the signal for driving these, and controls the drive of the calibration drive 32 and the shutter drive 36. He is trying to make a shutter 34 drive immediately after calibration termination with the driving signal from a control section 18 about the shutter drive 36. It is moved all over a light-receiving lens, and a shutter 34 is arranged so that outdoor daylight may not go into the light-receiving lens of a spectroscope 16. In this condition, the current (dark current) which appears in the photo electric conversion of a control section 18 is very minute. This is produced by the noise of an equipment proper etc. and it becomes possible by deducting this value from the above-mentioned measured value to obtain still more exact measured value.

[0102] The process of measurement of the internal quality of the garden stuff by this example is explained. Here, only a different part from the 1st example is explained. After measurement of the base line finishes, a terminate signal is outputted to a control section 18 from a spectroscope 16. In response to this signal, a control section 18 outputs a driving signal to the solenoid of the shutter drive 36. The shutter drive 36 moves a shutter 34 all over the light-receiving lens of a spectroscope 16 with this driving signal, and outdoor daylight is made not to carry out incidence to a spectroscope 16. In this condition, a spectroscope 16 measures a dark current. It is generated by the noise of an equipment proper etc. and a dark current is a very minute value. It becomes possible by deducting this value from the base line or the measured value of each specimen object 8 in operation part 20 to obtain still more exact measured value about each.

[0103] Here, the permeability T of each specimen object 8 (the i-th of the totals n) used by evaluation of the internal quality of a specimen object 8 is expressed by the following formula by the measured value Si of the frequency spectrum by the outgoing radiation light absorbed in part within the specimen object 8, the average R of the current value by the calibration, and the average D of a dark current value.

$$Ti=(Si-D)/(R-D) \quad \ldots (1)$$

That is, the ratio of the outgoing radiation light from a specimen object 8 to the outgoing radiation light from the lamp 12 through a filter is taken, and this is made into the permeability of a specimen object 8. Here, in each of a molecule and a denominator, the average D of a dark current value is subtracted from the measured value Si of the frequency spectrum by outgoing radiation light, or the average R of the current value by the calibration. This has eliminated the noise of spectroscope 16 proper. In addition, although [this example] a dark current is measured immediately after a calibration, it is good also as performing a calibration immediately after measurement of a dark current. The configuration, the process, and effectiveness other than this are the same as the 1st example.

[0104] The 3rd example of this invention is explained based on drawing 16 - drawing 18 . Here, explanation is omitted about the same configuration as the 1st example, and a different part is explained. As shown in drawing 16 , the equipment 1 of this example consists of the protection-from-light bucket 5, a sensor 4, and test-section 6 grade.

[0105] The specimen objects 8, such as a melon, are carried in the protection-from-light bucket 5 which appeared in the band conveyor 2, and a band conveyor 2 moves a specimen object 8 to the longitudinal direction A. In the middle of the migration direction A of a band conveyor 2, the sensor 4 and the test section 6 are formed. A sensor 4 is a photo sensor and can acquire the existence of the specimen object 8 on a band conveyor 2, spacing, and positional information by irradiating infrared light 10 on a band conveyor 2, and observing the reflected light. In the migration direction of a band conveyor 2, the test section 6 is located in the lower stream of a river of a sensor 4, irradiates light at a specimen object 8, and measures the internal quality of a specimen object 8 from the outgoing radiation light from a specimen object 8.

[0106] A test section 6 consists of a lamp 215, the 1st optical fiber 217, the 2nd optical fiber 219, the filter section 221, the 1st shutter 223, the 2nd shutter 225, a spectroscope 227, a photo sensor 4, a control section 229, and operation part 231 grade, as shown in drawing 17 .

[0107] a lamp 215 -- a specimen object 8 -- 3-5 LGTs are arranged at each right and left of a specimen

object 8 so that light can be mostly projected on the whole from the side face. It has the wavelength (650-950nm) of a near-infrared region, and after a part is absorbed inside the specimen object 8 with which it was projected on this light, as for the light on which it is projected by the specimen object 8 from a lamp 215, outgoing radiation of the transmitted light is carried out from a specimen object 8. Between the lamp 215 and the specimen object 8, the 1st optical fiber 217 of the number of lamps 215 and the same number is formed. The light sensing portion of each optical fiber 217 is turned to each lamp 215, and direct light-receiving of the light from a lamp 215 is possible for it.

[0108] The 1st shutter 223 and the filter section 221 are formed in the middle of the optical path of the 1st optical fiber 217. The filter section 221 consists of an ND filter and a diffusion plate like the filter 30 of drawing 3 . The 1st shutter 223 is opened and closed by the solenoid based on the existence of the specimen object 8 of a test section 6, and the light from the 1st optical fiber 217 carries out incidence to the filter section 221 in the condition that the 1st shutter 223 is opened. Since the configuration of the filter section 221 and effectiveness are the same as that of the filter 30 of the 1st example, explanation is omitted.

[0109] The 2nd optical fiber 219 which has the 2nd shutter 225 is connected to the opening 240 of the protection-from-light bucket 5 lower part. The 2nd shutter 225 is opened and closed by the solenoid (un-illustrating) based on the existence of the specimen object 8 of a test section 6, and in the condition that the 2nd shutter 225 is open, the light which penetrated the specimen object 8 passes along the opening 240 of the protection-from-light bucket 5 lower part, and carries out incidence of it to the 2nd optical fiber 219.

[0110] The 1st and 2nd optical fibers 217 and 219 join, turn into the 3rd optical fiber 233, and are connected to the spectroscope 227, and a spectroscope 227 can receive the light from the lamp 215 which passed the filter section 221 of the 1st optical fiber 217, or the transmitted light from the specimen object 8 through the 2nd optical fiber 219. In a spectroscope 227, the absorption-of-light spectrum which received light, or its quantity of light is measurable. It is possible for this to measure internal quality, such as a sugar content of a specimen object 8.

[0111] It has connected with a control section 229, and by the control section 229, the sensor 4 mentioned above changes into a current the quantity of light of the light which carries out incidence to a photo sensor 4 by photo electric conversion, by whether the current is larger than a predetermined value, it can distinguish the existence of the specimen object 8 in a test section 6, and, thereby, can detect spacing of the specimen object 8 on a conveyor 2. In addition, the above-mentioned predetermined value is a value determined by the class of specimen object 8, magnitude, the reading per second, etc., and the user of equipment sets it up before measurement initiation or during measurement.

[0112] Furthermore, it connects with the 1st shutter 223 and the 2nd shutter 225, and a control section 229 outputs the signal for driving these. When spacing of a specimen object 8 is under a predetermined value, the 2nd shutter 225 is opened wide, and the 1st shutter 223 is arranged so that the incidence of the light to the filter section 221 may be intercepted. The spectroscope 227 in this case receives the light from the protection-from-light bucket 5 through the 2nd optical fiber 219, and the light from the 1st optical fiber 217 does not receive it. On the other hand, when spacing of a specimen object 8 is beyond a predetermined value, the 1st shutter 223 is opened wide, and the 2nd shutter 225 is arranged so that the incidence of the light to the 2nd optical fiber 219 may be intercepted. The light from the 2nd optical fiber 219 does not receive light, but the spectroscope 227 in this case receives the light from a lamp 215 through the filter section 221. The calibration of a spectroscope 227 is performed based on the light from the filter section 221 in this condition. That is, since the calibration of equipment can be performed at any time not only the time of measurement initiation but during measurement using the light which passed the filter section 221, it is possible for it not to be influenced by fluctuation of the base line by measurement, but to be alike, and to measure the internal quality of garden stuff more correctly.

[0113] Operation part 231 is connected to the spectroscope 227, and the internal quality of the specimen object 8 which eliminated the effect of fluctuation of the base line, the noise of a spectroscope 227, etc. becomes measurable based on the current value of the frequency spectrum by the transmitted light from a specimen object 8, and the current value by the calibration. When measuring the specimen object 8 put

in order by the longitudinal direction of a band conveyor 2 by having considered as the above configuration, spacing of the specimen object 8 is detectable, and whenever the part whose spacing of a specimen object 8 is beyond a predetermined value reaches a test section 6, measurement of the calibration of equipment and a dark current can be performed. Therefore, not only before measurement initiation but after measurement initiation can perform a calibration at any time, and measurement does not interrupt it for a calibration. Therefore, the internal quality of garden stuff can be correctly measured by performing the calibration of equipment, without interrupting measurement.

[0114] The process of measurement of the internal quality of the garden stuff by this example is explained below. First, before starting measurement, measurement of the calibration of equipment and a dark current is performed. In the condition of having closed the 2nd shutter 225, a calibration opens the 1st shutter 223 wide and performs it by measuring the quantity of light of the light irradiated by the spectroscope 227 through the filter section 221 from the 1st optical fiber 217. The quantity of light of this light is changed into a current value with a spectroscope 227, and serves as the base line (or reference value) of this measurement of a specimen object 8. On the other hand, measurement of a dark current closes the shutters 223 and 225 of the 1st and 2nd both, and where the outdoor daylight included in a spectroscope 227 is intercepted entirely, it is performed. Spectroscope 227 the very thing in the condition of not going light into a spectroscope 227 has a dark current, and it can compute the current value which removed the effect of spectroscope 227 the very thing by deducting a dark current value from the measured value (current value which carried out photo electric conversion) by the next spectroscope 227.

[0115] Measurement of the internal quality of a specimen object 8 is performed when the specimen object 8 put in order and put on the longitudinal direction of a band conveyor 2 reaches a test section 6 by migration of a conveyor 2, respectively. That is, if the specimen object 8 carried in the protection-from-light bucket 5 reaches a test section 6, light will be directly irradiated from a lamp 215 and the outgoing radiation light absorbed in part within the specimen object 8 will carry out incidence of the specimen object 8 to a spectroscope 227 through the 2nd optical fiber 219 from the opening 240 prepared in the lower part of the protection-from-light bucket 5. The internal quality of a specimen object 8 can be measured with the frequency spectrum of this light. By the component contained in a specimen object 8, since a frequency with the strong quantity of light of light exists, this is because the configurations of frequency spectrum differ.

[0116] Continuation of measurement fluctuates the base line. This is based on environmental variations, such as a spectroscope 227, a test section 6, or temperature of the circumference of it, and in order to obtain a right measurement value, it must eliminate the effect by fluctuation of the base line. In this example, the base line is measured in the part as for which predetermined spacing is vacant between specimen objects 8. This value is saved at the operation part 231 connected to the spectroscope 227.

[0117] After measurement of the calibration at the time of measurement initiation and a dark current is completed, it is closed down and the 2nd shutter 225 is opened wide, and the 1st shutter 223 passes along the 2nd optical fiber 219 from opening of the protection-from-light bucket 5, and carries out incidence of the light from a lamp 215 to a spectroscope 227. If the specimen object 8 which appeared in the belt and has moved to the test section 6 of this condition reaches, the near-infrared light emitted from a lamp 215 is irradiated by the specimen object 8, and a part of that light will be absorbed by the specimen object 8, it will carry out outgoing radiation from a specimen object 8, and will carry out incidence to a spectroscope 227 through the 2nd optical fiber 219. And the internal quality of the specimen object 8 of a spectroscope 227 smell lever is measured.

[0118] Thus, whenever a specimen object 8 reaches a test section 6, the internal quality is measured one by one. If it is detected as spacing of a specimen object 8 being beyond a predetermined value by the photoelectrical sensor 4 during this measurement, it will judge that there is no control section 229 of eight specimen object in a test section 6, and the signal for closing the 2nd shutter 225 will be outputted. In response to this signal, the solenoid (un-illustrating) of the 2nd shutter 225 drives, and the optical path from the protection-from-light bucket 5 to a spectroscope 227 is intercepted. Moreover, a control section 229 outputs a driving signal to the solenoid (un-illustrating) of the 1st shutter 223. The 1st shutter 223

opens the optical path of the 1st optical fiber 217 which was being intercepted wide with this driving signal, and the light which minded the filter section 221 to the spectroscope 227 is made to carry out incidence. The base line of equipment can be measured by measuring the quantity of light of the attenuation light by this filter section 221. The base line can follow the fluctuation at any time, and the measured value of the base line is saved at operation part 231.

[0119] Here, the permeability shown below is used in evaluation of the internal quality of a specimen object 8. That is, the permeability T of each specimen object 8 (the i-th of the totals n) is expressed by the following formula by the measured value Si of the frequency spectrum by the outgoing radiation light absorbed in part within the specimen object 8, the average R of the current value by the calibration, and the dark current value D.

$$Ti=(Si-D)/(R-D) \quad \ldots (1)$$

That is, the ratio of the outgoing radiation light from a specimen object 8 to the outgoing radiation light from the lamp 215 through the filter section 221 is taken, and this is made into the permeability of a specimen object 8. Here, in each of a molecule and a denominator, the dark current value D is subtracted from the measured value Si of the frequency spectrum by outgoing radiation light, or the average R of the current value by the calibration. This has eliminated the noise of spectroscope 227 proper.

[0120] Deformation of this example is shown below. The 1st shutter 223 may be formed in the edge in the middle of the optical path of the 1st optical fiber 217. It does not need to touch, although it is desirable to prepare so that a band conveyor 2 may be touched when the 2nd shutter 225 may be formed in the edge in the middle of the optical path of the 2nd optical fiber 219 and it prepares in the edge by the side of a band conveyor 2. Although the incidence of the light to the photoelectrical sensor 4 formed separately performed detection of a specimen object 8, it may be judged with the quantity of light of the incident light to the 2nd optical fiber 219.

[0121] Although the specimen object 8 was made to carry in the protection-from-light bucket 5 on a band conveyor 2 and the outgoing radiation light from the protection-from-light bucket 5 lower part was observed in this example, light which carries out outgoing radiation of the belt of a conveyor from a specimen object 8 may be used as the mesh belt which can be observed from the lower part. projection of the light from a lamp 215 to a specimen object 8 -- a specimen object 8 -- if projection of light is almost possible to the whole, it is good even from not a side face but a top face etc. The light emitted from the photoelectrical sensor 4 may be the light of wavelength other than infrared light. The light emitted from a lamp 215 may be the light of wavelength other than near-infrared light. An optical fiber is sufficient as a lamp 215, and 1 [not only three LGTs but] LGT, two LGTs, or more than it is sufficient also as the number.

[0122] Next, the 4th example is explained. Here, explanation is omitted about the same configuration as the 3rd example, and only a different part is explained. In this example, it is supposed that a calibration can be performed at the time of arbitration. That is, when it is not concerned with whether a specimen object 8 is in a test section 6 but the user of this equipment wants, a calibration can be performed if needed.

[0123] The process of measurement of the internal quality of the garden stuff by this example is explained. Here, only a different part from the 3rd example is explained. In this example, the user of this equipment issues directions of calibration initiation by mechanical or electric actuation after measurement initiation of the internal quality of garden stuff. or automatically [when it judges that the base line of measurement exceeded the fixed range in operation part 231 or a control section 229] It is supposed that ****** and the 2nd shutter 225 are closed to the existence of the specimen object 8 in a test section 6, the 1st shutter 223 is opened wide, and a calibration is performed.

[0124] Thereby, since a calibration can be carried out to the time amount of arbitration, the base line is fixed and it becomes possible to measure the internal quality of garden stuff more correctly. The configuration, the process, and effectiveness other than this are the same as the 3rd example.

[0125] Next, the 5th example is explained. Here, explanation is omitted about the same configuration as the 3rd example, and only a different part is explained. In this example, it is supposed that a dark current is measured following on the calibration after measurement initiation of the internal quality of garden

stuff. The process of measurement of the internal quality of the garden stuff by this example is explained. Here, only a different part from the 3rd example is explained.
[0126] After measurement of the base line finishes, the 1st shutter 223 is closed in the condition [having closed the 2nd shutter 225]. Closing motion of this shutter is controlled by the signal from a control section 229. In this condition, a spectroscope 227 measures a dark current. It is generated by the noise of an equipment proper etc. and a dark current is a very minute value. It becomes possible by deducting this value from the base line or the measured value of each specimen object 8 in operation part 231 to obtain still more exact measured value about each.
[0127] Here, the permeability T of each specimen object 8 (the i-th of the totals n) used by evaluation of the internal quality of a specimen object 8 is expressed by the following formula by the measured value Si of the frequency spectrum by the outgoing radiation light absorbed in part within the specimen object 8, the average R of the current value by the calibration, and the average D of a dark current value.
$Ti=(Si-D)/(R-D)$ ... (1)
That is, the ratio of the outgoing radiation light from a specimen object 8 to the outgoing radiation light from the lamp 215 through a filter is taken, and this is made into the permeability of a specimen object 8. Here, in each of a molecule and a denominator, the average D of a dark current value is subtracted from the measured value Si of the frequency spectrum by outgoing radiation light, or the average R of the current value by the calibration. This has eliminated the noise of spectroscope 227 proper. In addition, although [this example] a dark current is measured immediately after a calibration, it is good also as performing a calibration immediately after measurement of a dark current. The configuration, the process, and effectiveness other than this are the same as the 3rd example.
[0128] With reference to drawing 18 - drawing 27 , the further example of this invention is explained below. Here, explanation is omitted about the same configuration as the 1st example, and a different part is explained. Drawing 18 and drawing 19 are drawings showing the interior quality evaluation equipment of garden stuff of the 6th example of this invention in graph, drawing 18 is the plan and drawing 19 is the 19-19 view Fig. of drawing 18 .
[0129] The equipment of this example has a band conveyor 2, and two or more analyte garden stuff 8 is laid at random on it. A band conveyor 2 is driven in the direction P of an arrow head of drawing with a non-illustrated driving shaft, and the garden stuff 8 on it also moves it along a predetermined conveyance way along with it. Moreover, the encoder (drawing 18 un-illustrating) is attached in the band conveyor 2 at drawing 2 , and the monitor of the movement magnitude of a conveyor is carried out per 0.1mm. The halogen lamp light source 12 which floodlights light to analyte garden stuff 8 on both sides on both sides of a band conveyor 2 at the position in the conveyance way on a band conveyor 2 is installed. The light source 12 is constituted so that spot light with a diameter of about 2cm may be irradiated at garden stuff.
[0130] In the same location as the above-mentioned light source 12 in a conveyance way, as shown in drawing 19 , right above the band conveyor 2, the photo sensor 303 which receives the light from analyte garden stuff 8 is formed. The spectrum of the light received by the photo sensor is carried out to two or more wavelength range channels, it performs spectral analysis by the approach of the common knowledge which investigates the absorbance for every channel, and measures and evaluates the sugar content, the acidity and the degree of ripeness, and other various internal quality of analyte garden stuff 8. Since this approach itself is well-known, explanation is omitted. In addition, some of light sources 12, photo sensors 303, and conveyors 2 of the circumference of it are enclosed with the non-illustrated box in one, and it is covered from outdoor daylight.
[0131] The position sensor 4 which consists of a pair of floodlighting component 4a and photo detector 4b is formed in the upper location of a band conveyor 2. In case analyte garden stuff 8 passes through between a floodlighting component and a photo detector, by change of the output signal of the photo detector started by interrupting light, the location of the garden stuff 8 on a band conveyor can be detected. Measurement timing is controlled so that analyte garden stuff 8 measures at the moment of passing through the measurement location by the light source 12 and the photo sensor 303 based on the positional information detected here and the movement magnitude information acquired by the encoder

formed in the band conveyor 2.
[0132] Moreover, the transverse diameter of analyte garden stuff 8 can be known from the movement magnitude information acquired with an encoder, and the time amount by which light is interrupted in the position sensor 4. That is, position sensors 4a and 4b can also be used as a transverse-diameter sensor. All of a position sensor, the encoder of a band conveyor, and a photo sensor are connected to Equipment CPU, and control of all equipments, such as control of the above-mentioned measurement timing and calculation of the transverse diameter, is performed above by CPU.
[0133] Then, the 7th example of this invention is explained. This example prepares the protection-from-light plate for shading the stray lights, such as light which carries out direct incidence to a photo sensor 303 from the light source 12, light reflected on the front face of analyte garden stuff, and light which this reflected light reflected in a certain element of equipment further. Since the configuration of the whole equipment is the same as that of the 6th example shown in drawing 18 , it omits explanation, and it explains only the part of a protection-from-light plate.
[0134] Drawing 20 is drawing showing the configuration near the measurement location of the equipment of the 7th example, and (a) is a side elevation from the direction where the side elevation corresponding to drawing 19 of the 6th example and (b) make the plan of the part concerned, and (c) makes (a) and 90 degrees. As shown in drawing 20 (a) and (b), by this example, two protection-from-light plates 310 are formed so that garden stuff may be inserted, and it is shading so that the stray lights, such as light reflected on the front face of garden stuff 8, light in which this reflected light was further reflected with the equipment element, or light which comes directly from the light source 12, may not carry out incidence to a photo sensor 303. The protection-from-light plate is prepared almost at a level with a location lower than the height of garden stuff 8 above the exposure spot Q to which the light from the light source 12 irradiates garden stuff 8 as best shown in (c) of drawing 20 .
[0135] Make spacing of two protection-from-light plates 310 into a larger fixed dimension than the maximum which the transverse diameter of the garden stuff as 1 analyte can expect. Or or it enables it to change spacing for every class of 2 measuring object in consideration of the anticipation maximum of the transverse diameter of the kind of garden stuff (namely, whenever [which changes an apple, a peach, and the measuring object, for example]), there may be a configuration of considering as the automatic adjustable according to the transverse diameter of the specimen of 3 each. The block diagram of the device control system in 3) is shown in drawing 21 . CPU320 sends a command to the protection-from-light plate driving gear 306 so that it may become protection-from-light plate spacing according to the transverse diameter which computed and computed the transverse diameter of analyte based on the output of a location and the transverse-diameter sensor 4. According to it, the protection-from-light plate driving gear 306 moves the protection-from-light plate 310 with motor power, and sets up protection-from-light plate spacing. Suitably, in order to raise the effectiveness of protection from light, spacing is set up so that the clearance between a protection-from-light plate and analyte garden stuff may become minute.
[0136] Next, the 8th example of this invention is explained. Although the equipment of the 8th example is equipped with the protection-from-light plate which shades the stray light like the 7th example, the equipment of the 7th example differs in the installation location of a protection-from-light plate. Since this example of the configuration of the whole equipment is the same as the 6th example, only the part of a protection-from-light plate is explained.
[0137] Drawing 22 is drawing showing the configuration near the measurement location of the equipment of the 8th example, and the side elevation corresponding to drawing 19 of the 6th example in (a) and (b) are the plans of the part concerned. As shown in (a) of drawing 2222 , and (b), by this example, it is shading so that the stray lights, such as light which formed two protection-from-light plates 311 above analyte garden stuff 8, and was reflected on the front face of garden stuff 8, or light which comes directly from the light source 12, may not carry out incidence to a photo sensor 303.
[0138] Make the height of two protection-from-light plates 311 into a larger fixed dimension than the maximum which the height of the garden stuff as 1 analyte can expect. Or or it enables it to change height for every class of 2 measuring object in consideration of the anticipation maximum of the height

of the kind of garden stuff (namely, whenever [which changes an apple, a peach, and the measuring object, for example]), there may be a configuration of considering as the automatic adjustable according to the height of the specimen of 3 each. The block diagram of the device control system in 3) is shown in drawing 23 . CPU320 sends the command for setting up the protection-from-light plate height according to the height which computed and computed the height of analyte based on the output of the height sensor 307 to the protection-from-light plate driving gear 306. It sets up so that it may become high slightly from the height of the analyte which drove the motor to which the protection-from-light plate driving gear 306 moves the protection-from-light plate 311 according to it, and the height of the protection-from-light plate 311 computed.

[0139] The configuration of a height sensor is shown in drawing 24 . This height sensor is arranged at the upper twist of the analyte conveyance way on a band conveyor 2. A height sensor consists of projector 307a and electric-eye 307b which have been countered and arranged on both sides of a band conveyor 2. Projector 307a of the height sensor 307 has two or more floodlighting components 307a1 arranged at equal intervals in the lengthwise direction, and electric-eye 307b is arranged by height equal to each floodlighting component 307a1 of projector 307a, respectively, and has the photo detector 307b1 which receives the light beam from the corresponding floodlighting component 307a1. In case analyte garden stuff 8 passes through between projector 307a and electric-eye 307b, the beam which goes to a photo detector 307b1 from each floodlighting component 307a1 in a location lower than this garden stuff is interrupted. That is, by detecting of which height even the beam was interrupted, the height of analyte garden stuff 8 is discretely detectable.

[0140] Then, the 9th example of this invention is explained. As for the equipment of the 9th example, the configuration of a protection-from-light plate differs from the 7th and 8th example of the above. Drawing 25 is the side elevation showing the configuration of the protection-from-light plate of the equipment of the 9th example. Each protection-from-light plate 312 is supported possible [a drive] around Shaft O. The configuration of the control system of the equipment of this example is the same as that of the 8th example shown in drawing 23 . With the equipment of this example, based on either of the height of the analyte garden stuff detected by the transverse diameter or the height sensor 307 of analyte garden stuff detected by the location and the transverse-diameter sensor 304, or both information, the angular position of the circumference of the shaft O of the protection-from-light plate 312 is adjusted, and it sets up so that the clearance between a protection-from-light plate and garden stuff may become small. Drawing 25 shows the protection-from-light plate location to the analyte 8 of the magnitude drawn as a certain continuous line, and the protection-from-light plate location somewhat smaller than it which was drawn with the broken line analyte 8' Receiving. In addition, the control system of this example can be constituted like the 8th example which showed to drawing 23 and was explained above.

[0141] Moreover, as a modification of the 9th example, the location of a protection-from-light plate cannot be made into regulating automatically, but it can also consider as the configuration which pushes up a protection-from-light plate by the garden stuff itself which moves by conveyor. Such an example is shown in drawing 26 . This example attaches the upward curling (curve) C0 to the corner where the upstream of each protection-from-light plate 312 counters, and the protection-from-light plate 312 is made to be pushed up by the analyte itself along with migration of the analyte by the conveyor. Since the device in which the size of analyte is detected, and the device in which the location of a protection-from-light plate is adjusted according to it become unnecessary in the case of this modification, a configuration can be simplified.

[0142] Then, the 10th example of this invention is explained. The equipment of the 10th example is characterized by shading the stray light using the tray fixed on the band conveyor. Since the configuration of the whole equipment of the 10th example is the same as that of the 6th example, explanation is omitted, and only the part about a tray is explained.

[0143] Drawing 27 is drawing showing the outline of the tray in the equipment of the 10th example. Drawing 27 (a) is the side elevation, and shows the tray itself in the cross section. Moreover, drawing 27 (b) is a side elevation from the direction which makes 90 degrees to drawing 27 (a). As shown in

drawing, with the equipment of this example, the tray 314 is placed on the band conveyor 2, and analyte garden stuff 8 is placed on this tray 314. Hole 314a has opened in each side face which counters in the direction which crosses the conveyor belt of this tray 314. The light from the light source 12 is irradiated by analyte garden stuff 8 through hole 314a so that drawing 27 (a) may show. Since the light reflected on the garden stuff front face is effectively shaded on a tray 314, incidence is hardly carried out to a photo detector 303. In addition, two or more trays 314 are placed on a band conveyor. Although the example of above some was explained, this invention is not limited to the details of these examples. for example, an example -- although the band conveyor is used if it is, other various transport devices can be used.

[0144] Moreover, although the two light sources arranged at the both sides of a conveyance way are used in the 6th - the 10th example, one is sufficient as this and it may use the three or more light sources. Moreover, in the 7th - the 9th example, when the light source is prepared only in one side of a band conveyor, the protection-from-light plate of it and the opposite side can also be omitted. Moreover, in the 6th - the 10th example, although the light from the light source is floodlighted from a horizontal direction, from the slanting upper part or a slanting lower part, this may be leaned and it may irradiate it. Moreover, although floodlighted in the example from the direction which sees from the upper part and makes a right angle to the conveyance direction on a band conveyor, it is also possible to also lean this and to irradiate it.

[0145] Furthermore, although the halogen lamp is used as the light source with the equipment of an example, it is possible not only this but to use the light source of others which emit the light of a wavelength field used for measurement. Limitation does not have garden stuff used as the measuring object of the equipment of this invention in the class and magnitude, and it can be applied to various garden stuff by arranging suitably the size of equipment, and the number and the quantity of light of the light source. Moreover, internal quality measurement of all the garden stuff that the internal quality measured by the equipment of this invention also makes a sugar content and acidity the example of representation, in addition can be measured by spectral analysis is included.

[0146] It continues and the 11th example of this invention is explained. Here, explanation is omitted and the same configuration as the 1st example is explained focusing on a different part. Drawing 28 R> 8 is drawing showing the artificial garden stuff reference object 410 as an example of this invention, (A) is a perspective view and (B) is a sectional view. This artificial garden stuff object consists of glassware 401 of the shape of a with a diameter height [80mm height of 65mm] cylinder, and a light transmission object 402 held into it. A container top face is also covered and sealed with the glass lid 404. A light transmission object mixes cerium oxide of 0.3 micrometers of **** as a light-scattering object in a citric-acid water solution 1%, and homogeneity is made to diffuse it, and it gels it by polyacrylamide gel. The amount of the cerium oxide to mix is suitably set up according to the class of garden stuff used as analyte. The artificial garden stuff object 410 of this example equips the interior of the light transmission object 402 with the temperature detector (thermometry means) 403 using the thermistor for measuring the temperature of this light transmission object etc.

[0147] Next, how to amend the measured value of the internal quality measuring device of garden stuff using this artificial garden stuff object 410 is explained. Drawing 29 is drawing showing the configuration near the measuring point of a garden stuff measuring device. The measuring device has the band conveyor 422 and the analyte garden stuff (for example, mandarin orange) set on this band conveyor 422 is sent to a measuring point one by one. In a measuring point, light is floodlighted by analyte with the floodlighting equipment 420 which consists of the light source 411, diaphragm 412, and a lens system 413. Incidence of the light which passed analyte is carried out to a photo sensor 414. The spectrum of the light which carried out incidence to the photo sensor is carried out to two or more wavelength range channels, it performs spectral analysis by the approach of the common knowledge which investigates the absorbance for every channel, and computes the internal quality of analyte garden stuff S, for example, acidity. Since this approach itself is well-known, explanation is omitted.

[0148] Equipment is equipped with the artificial garden stuff object 410, and according to the device in which it does not illustrate, this artificial garden stuff object 410 goes up and down in a measuring point,

and can move now between the proofreading location set between the floodlighting system and the photo sensor, and the normal positions evacuated from there. The result of having measured the transmitted light spectrum of the artificial garden stuff object of this example to drawing 31 is shown. Although the mandarin orange, the pear, and the transmitted light spectrum of the respectively actual fruits of an apple are also drawn on this drawing together, especially in a near-infrared region with a wavelength of 810nm or more, it turns out that the spectral characteristics of the artificial garden stuff object 410 are often following in footsteps of spectral characteristics of real fruits.

[0149] With the amendment approach of internal quality measurement of garden stuff and equipment which were explained above, with the correction value acquired using the single artificial garden stuff reference object, although the measured value of garden stuff is amended, the approach and equipment which amend using two or more artificial garden stuff reference objects are explained below.

[0150] The example of the equipment which proofreads using two or more artificial garden stuff is shown in drawing 30 . The equipment shown in drawing 30 has the floodlighting system 420 and photo sensor 414 which consist of the halogen lamp light source 411, diaphragm 412, and a lens system 413 like the equipment of drawing 29 . This equipment has the revolver 430 which made four more holes. The artificial garden stuff objects 410a, 410b, and 410c are inserted in three of four holes of a revolver, respectively. Nothing is attached in the one remaining holes. Three artificial garden stuff objects are created based on three kinds of solutions with which concentration differs, respectively. That is, it is 1% of concentration, 2%, and 3% of citric-acid solution, respectively. All of three artificial garden stuff objects of each other are equally made except citric-acid concentration. A revolver is driven with a stepping motor 415, sets each artificial garden stuff object as a measuring point one by one at the time of amendment actuation, and measures each amount of transmitted lights. In addition, it is made to make the light from a floodlighting system project on analyte garden stuff S through the transparent hole 431 at the time of the usual garden stuff measurement of those other than the time of amendment actuation.

[0151] A single artificial garden stuff object amends with the equipment of the example shown in drawing 29 described above. Therefore, it was not concerned with the acid concentration in measurement of all analyte garden stuff, but fixed correction value is given. With the equipment of this example, it measures to the reference object of three sorts of different citric-acid concentration to it. Since fluctuation of the acidity measured value accompanying environmental variations, such as temperature, may differ according to the acid concentration of analyte, this is for performing high amendment in consideration of the concentration of analyte of precision more. Since correction value can be calculated using the artificial garden stuff reference object of 1%, 2%, and 3% of each citric-acid concentration, respectively in this example and amendment according to the acid concentration of analyte can be performed using the correction value of these plurality, amendment precision improves more. What is necessary is to ask for the concentration-correction value straight line which specifically connects each correction value to a linear in approximation, and just to perform amendment according to the concentration of analyte based on this straight line.

[0152] in addition, by using a light-scattering object like the invention in this application, the artificial garden stuff object configuration arranged by the revolver type in the equipment shown in this drawing 30 adjusts light transmittance, and will not become possible without by having brought about the small (namely, light transmission lay length -- small) artificial garden stuff object configuration. Although this invention was explained above based on the example, this invention is not limited to the details.

[0153] For example, although the artificial garden stuff object all makes the water solution of a citric acid the subject in the above-mentioned example, the other water solutions of not only a citric acid but others, such as an acid and sugar, may be used. Moreover, in an artificial garden stuff object, in order to attenuate the transmitted light, the optical dispersing element is mixed in a water solution. Carrying out permeability adjustment is also considered by lowering the permeability in the direction of a container instead of adding an optical dispersing element. Moreover, although glass is used in the above-mentioned example as a container of an artificial garden stuff object, the ingredient which has light transmission nature by resin etc. is sufficient. The configuration except having stated above, an operation, and effectiveness are the same as the 1st example.

[0154] Next, the 12th example of this example is explained. Here, explanation is omitted and the same configuration as the 1st example is explained focusing on a different part. Drawing 32 is drawing showing the artificial garden stuff reference object (artificial garden stuff object) 540 of this example, drawing 32 A is a perspective view and 32B is a sectional view. In this example, it replaces with the artificial garden stuff object 40 of the 1st example, and the artificial garden stuff object 540 is used. This artificial garden stuff reference object 540 consists of a resin container 546 which height of 80mm and a base are one-side the rectangular parallelepipeds of the square it is [square] 65mm, and has formed glass 544 in the 1st of those side faces 542, and a light transmission object 548 held into it. In addition, a container top face is covered and sealed with the lid 550 made of the resin of the same quality of the material as the resin container 546. Heat-resistant glass 544 is formed in the side face 542 of the resin container 546 in parallel with the side face 542.

[0155] In this example, as shown in drawing 32 B, the inside 500 of a container 546 inclines in the direction of a vertical. Thereby, spacing of a side face 542 becomes narrow towards the upper part of a container 546 to a base, and the thickness of a side face 542 is thick towards the upper part of a container 546 to the base. If it floodlights in the upper part of the resin container 546 when floodlighting from Q and making outgoing radiation carry out in the direction of R, while carrying out outgoing radiation through the thin part of a side face 542, and the long part of the light transmission object 548, if it floodlights in the lower part of the resin container 546, outgoing radiation will be carried out through the thick part of a side face 542, and the short part of the light transmission object 548. That is, rather than the light floodlighted in the lower part, since it is hard to be influenced of a side face 542, outgoing radiation of the light floodlighted in the upper part of the resin container 546 is carried out with higher permeability.

[0156] How to amend the measured value of the internal quality measuring device of garden stuff using this artificial garden stuff object 540 is explained. In this example, rise and fall of the artificial garden stuff object 540 are minutely enabled up and down in the proofreading location 74 of drawing 5 R> 5 within limits which can be floodlighted into one part of the side faces 542 of the resin container 546.

[0157] In this example, the resin container 546 which constitutes the artificial garden stuff object 540 can penetrate light, and the amount of transparency changes with the thickness. Thus, in the constituted artificial garden stuff object 540, the amount of the light by which outgoing radiation is carried out from the container side face 542 which floodlights almost at right angles to the container side face 542, and counters becomes what changed with thickness of a side face 542. That is, when the light of the same quantity of light as two parts from which thickness differs among side faces 542 is floodlighted, there are few amounts of the light which penetrates a thick side-face part, and its permeability of light is lower [the thick side-face part] than the amount of the light which penetrates a thin side-face part. In this example, it is changeable into the part which has permeability which is different in the part by which it is floodlighted of the side faces 542 according to the class of analyte, modification of a lot or an environmental change, etc. using this property by making it go up and down the artificial garden stuff object 540.

[0158] As stated above, according to this invention, modification of a floodlighting system and a light-receiving system becomes nothing possible [without rotating the artificial garden stuff object 540 further / choosing the artificial garden stuff object 540 according to modification of analyte]. This example is instantiation and this invention is not limited to this.

[0159] The configuration of the inside 500 of the artificial garden stuff reference object 540 may have the shape of a square spindle or a cone that the thickness of a side face 542 should just be changing in the direction of a vertical of a container 546. Moreover, as long as it inclines, you may not be a candidate for right and left to the shaft of the direction of a vertical of a container 546. Furthermore, as for an inclination, the thickness of a side face 542 decreases from a lid 550 side to the base side of a container 546. The configuration, the operation, and effectiveness except having stated above are the same as the 1st example.

[0160] It continues and the 13th example of this example is explained. Here, explanation is omitted and the same configuration as the 1st example or the 12th example is explained focusing on a different part.

Drawing 33 is the sectional view of the artificial garden stuff reference object (artificial garden stuff object) 640 as this example. In this example, it replaces with the artificial garden stuff object 40 of the 1st example, or the artificial garden stuff object 540 of the 12th example, and the artificial garden stuff object 640 is used, and as shown in drawing 33 , the inside 600 of a container 646 is formed stair-like in the direction of a vertical. Thereby, spacing of a side face 642 becomes narrow gradually towards the upper part of a container 646 to a base, and the thickness of a side face 642 is thick gradually towards the upper part of a container 646 to the base. If it floodlights in the upper part of the resin container 646 when floodlighting from T and making outgoing radiation carry out in the direction of U, while carrying out outgoing radiation through the thin part of a side face 642, and the long part of the light transmission object 648, if it floodlights in the lower part of the resin container 646, outgoing radiation will be carried out through the thick part of a side face 642, and the short part of the light transmission object 648. That is, rather than the light floodlighted in the lower part, since it is hard to be influenced of a side face 642, outgoing radiation of the light floodlighted in the upper part of the resin container 646 is carried out with higher permeability. The configuration, the operation, and effectiveness except having stated above are the same as the 1st example or the 12th example.

[0161] Next, the 14th example of this invention is explained. Here, explanation is omitted and the same configuration as the 1st example is explained focusing on a different part. In this example, the 1st example extracts, it replaces with 66, and the gobo 712 is used. Drawing 34 is the perspective view having shown the configuration of the floodlighting optical system 702. In this example, a gobo 712 has plurality 720, for example, two circular stomata. These stomata 720 have a different diameter, and when the light of the same amount of floodlighting is floodlighted from the lamp 710 arranged at the tooth back of a gobo 712 to each stoma 720, from each stoma 720, outgoing radiation of the light of the quantity of light proportional to the opening area is carried out from gobo 712 transverse plane. By the motor 730, the gobo 712 is movable in the direction V of a vertical, and two or more stomata 720 are formed for it in it along this migration direction V. Therefore, the desired stoma 720 can be arranged on the optical axis of a lamp 710 and a lens 714 by moving a gobo 712 in the direction V of a vertical by the motor 730.

[0162] Selection of a stoma 720 is performed based on the class of garden stuff which is analyte. That is, in measuring the internal quality of the garden stuff which is easy to penetrate light, it makes the amount of floodlighting to analyte small using a stoma with a small diameter. On the other hand, in the case of the garden stuff which cannot penetrate light easily, a stoma with a large diameter is used, and the amount of floodlighting to analyte is enlarged. Thus, by choosing a stoma 720 according to the class of analyte, and changing the quantity of light which irradiates analyte, the quantity of light by the class of analyte by which outgoing radiation is carried out from a specimen object ** can be carried out to more than constant value, thereby, it cannot be based on the class of specimen object, but can be alike, and the internal quality of garden stuff can be measured more correctly.

[0163] The example of measurement of this example is shown below. As the 1st example, the internal quality of the mandarin orange which is easy to penetrate light is measured. The stoma of a gobo 712 chooses the one where a diameter is smaller. In this case, although the amount of floodlighting to analyte is small, since the quantity of light by which outgoing radiation is carried out from analyte is sufficiently large, it can measure the internal quality of analyte with this absorption spectrum.

[0164] Next, the internal quality of the apple which cannot penetrate light easily is measured as the 2nd example. The stoma 720 of a gobo 712 chooses the one where a diameter is larger. In this case, since the amount of floodlighting to analyte is large, the quantity of light by which outgoing radiation is carried out from analyte is large enough, and can measure the internal quality of analyte with this absorption spectrum. Measuring conditions other than this are the same as that of the case where analyte is a mandarin orange, and can measure the internal quality of analyte with the outgoing radiation absorption-of-light spectrum from analyte.

[0165] The modification of this example is shown below. As long as the number of the stoma 720 prepared in a gobo 712 is plurality, it may be how many. In this example, although it presupposed that it goes up and down a gobo 712 to an one direction V and the stoma 720 was formed along the rise-and-

fall direction V, though it can move by the 2-way of a direction perpendicular to the direction V of a vertical in the field which does not limit the migration direction of a gobo 712 in the direction V of a vertical, for example, contains the direction V of a vertical, and a gobo 712, it is good. In this case, a stoma 720 can be formed in the location of the arbitration in a gobo 712, and can arrange the desired stoma 720 on the optical axis 18 of a lamp 710 by moving a gobo 712 to the aforementioned 2-way. The configuration of a stoma may not be circular. The stoma prepared in the gobo like this example may not perform control of the quantity of light of the light floodlighted to analyte, but a filter may perform it. About the configuration except having stated above, an operation, and effectiveness, it is the same as that of the 1st example.

[0166] The 15th example is explained below using drawing 35 . Drawing 35 is the perspective view showing the configuration of the floodlighting optical system 702 of the 15th example. In this example, the circular gobo 740 is formed in the field perpendicular to the optical axis 718 of the floodlighting optical system 702. A gobo 740 rotates a shaft 741 as a core by the motor 742 connected to the shaft 741 established in the direction perpendicular to a gobo 740 from the core. The circular stoma 744 from which plurality, for example, two diameters, differs in a gobo 740 is formed in the equidistant location from the core of a gobo 740. By this configuration, a stoma 744 can be chosen according to the class of analyte.

[0167] When measuring the internal quality of the garden stuff which is easy to penetrate light, the stoma 744 of a gobo 740 chooses the one where a diameter is smaller. In this case, although the amount of floodlighting to analyte is small, since the quantity of light by which outgoing radiation is carried out from analyte is sufficiently large, it can measure the internal quality of analyte with this absorption spectrum. On the other hand, when measuring the garden stuff which cannot penetrate light easily, the stoma of a gobo 712 chooses the one where a diameter is larger. In this case, since the amount of floodlighting to analyte is large, the quantity of light by which outgoing radiation is carried out from analyte is large enough, and can measure analyte with this absorption spectrum. About the configuration and operation of those other than this, it is the same as that of the 1st example.

[0168] It continues and the 16th example is explained. Garden stuff has a 1 or those with plurality, and conveyor top conveyed in the 16th example. It has the test section which has the same floodlighting optical system as the 14th example, and a spectroscope on both sides of a conveyor in the middle of the conveyor. Furthermore, in this example, it is the conveyance direction in the middle of a conveyor, and the photoelectrical sensor is formed in the upstream or measurement circles rather than the test section, and it is possible for this to measure the magnitude of each garden stuff on a conveyor.

[0169] Since the magnitude of garden stuff is detectable by the photoelectrical sensor with the configuration of this example, it is possible by making it go up and down floodlighting optical system and a spectroscope according to this detection result, and changing that height to floodlight the light from a lamp in that equatorial section, without being automatically concerned with the magnitude of analyte. For this reason, it is possible to measure the internal quality of each analyte conveyed continuously at a high speed on the same conditions. About the configuration and operation of those other than this, it is the same as that of the 1st example.

[0170] Next, the 17th example of this example is explained with reference to drawing 3636 . Here, explanation is omitted and the same configuration as the 1st example is explained focusing on a different part. Drawing 36 is the sectional view showing the artificial garden stuff reference object (artificial garden stuff object) 760 as an example of this invention. This artificial garden stuff reference object 760 consists of the diameter of 65mm, the container 751 made from a vinyl chloride of the shape of a cylinder with a height of 80mm, a light transmission object 752 held into it, and light-scattering layer slack adhesive tape 770 stuck on the side face of the container made from a vinyl chloride. In addition, a container top face is covered and sealed with the lid 754 made from the vinyl chloride of the same quality of the material as a container 751.

[0171] In this example, adhesive tape 770 is a resin tape and the light irradiated towards the artificial garden stuff object 760 is scattered about with adhesive tape 770. Thus, the spectral characteristics of the constituted artificial garden stuff object 760 are often following in footsteps of spectral characteristics of

actual fruits. Moreover, heat-resisting glass 780 is formed in the side face of a container 751 in parallel with the side face of a container so that the perimeter of adhesive tape 770 may be surrounded. For the heat-resisting glass layer of two sheets, it opened, heat-resisting glass 780 has formed about 10mm gap 782 in parallel with a container side face, and this clearance is filled with the citric-acid water solution 1%. Thus, by constituting, thermal resistance improves [rather than] further only using heat-resisting glass.

[0172] As a light transmission object 752 held in the container 751, the citric-acid water solution is used 1% as a water solution of an acid. Furthermore, the artificial garden stuff object 760 of this example equips the interior of the light transmission object 752 with the temperature detector (thermometry means) 753 using the thermistor for measuring the temperature of a light transmission object etc. This example is instantiation and the following deformation is also possible for it.

[0173] About a container 751, the quality of the material may be glass, polyethylene, and polyfluoroethylene. Moreover, the configuration of a container 751 is good in the configuration of arbitration, such as a rectangular parallelepiped. The tape of the thing containing a cellulose made of paper, for example, a product, is sufficient as adhesive tape, and it may not have adhesiveness. Moreover, it may consist of high polymers other than resin. It may replace with adhesive tape and a light-scattering layer may be prepared in the front face of a container 751 by paint, the spray, immersion, etc. Adhesive tape may be stuck only on the optical-path part of the exposure light to a container 751.

[0174] Heat-resisting glass 780 may be constituted only from one layer, and may fill between container side faces with a water solution. Heat-resisting glass 780 may consist of three or more layers. A gap 782 may be formed in the heat-resisting glass of one layer. Heat-resisting glass may be formed only in the optical-path part of the exposure light to a container 751. The heat-resistant matter which penetrates light instead of heat-resisting glass 780 is sufficient.

[0175] The water solution of acids other than 1% citric-acid water solution may be used for a gap 782, and the water solution and water of sugar are sufficient. Moreover, if it is made to make these water solutions flow, thermal resistance will improve. Moreover, a light-scattering object may be put into the water solution in a gap 782, and there may not be adhesive tape 770 in this case. The configuration, the operation, and effectiveness except having stated above are the same as the 1st example.

[0176]

[Effect of the Invention] By this invention, when measuring the specimen object put in order by the longitudinal direction of the belt of a band conveyor, it is that longitudinal direction, and a part without a specimen object can be detected and the calibration of equipment can be performed in this part. Therefore, not only before measurement initiation but after measurement initiation can perform a calibration at any time, and measurement does not interrupt it for a calibration. Therefore, the internal quality of garden stuff can be correctly measured by performing the calibration of equipment, without interrupting measurement.

[0177] Moreover, according to the amendment approach of this invention, the error by the environmental variation of internal quality measurement of garden stuff can be amended using the reference object which has the variability of the absorption spectrum according to actual analyte garden stuff and a similar environmental variation. It is effective to especially environmental temperature change. Since it becomes unnecessary to carry out temperature control (management) of equipment or a perimeter environment by this, those costs can also be reduced.

[0178] Moreover, as explained using drawing 7 , by the amendment approach using the artificial garden stuff reference object and it by the invention in this application, without waiting for stabilization of the light source, since it has sufficient imitation nature also to the difference in the condition of the light source, it is also possible to start measurement immediately after turning on the light source, and measurement effectiveness can be raised.

[0179] Even when the temperature measurement means which acts as the monitor of the temperature of the transparency object of artificial garden stuff, such as a thermistor, is established, and the temperature of artificial garden stuff and analyte garden stuff differs, amendment in consideration of it can be performed. Moreover, still more exact amendment can be performed by amending using the artificial

garden stuff object of two or more concentration.
[0180] The artificial garden stuff reference object of this invention can make light transmittance a suitable value by mixing an optical dispersing element in a water solution. Moreover, permeability can be easily adjusted by adjusting the concentration of an optical dispersing element. Moreover, the stable artificial garden stuff to which an optical dispersing element does not sediment can be obtained by adding and gelling a gelling agent in a water solution with the artificial garden stuff object of this invention.
[0181] By having an artificial garden stuff reference object, the internal quality measurement of the interior quality measuring device of garden stuff of this invention which amended fluctuation of the absorption spectrum of the garden stuff by the environmental variation is attained. Moreover, two or more artificial garden stuff reference objects are offered, with the equipment which changed the concentration of each reference object, it depends according to the concentration of analyte garden stuff, and exact amendment can be performed with a possible thing.
[0182] Furthermore, in this invention, it is not concerned with the magnitude of analyte but light can be irradiated near the equatorial section of analyte. Therefore, it becomes possible to measure the internal quality of each analyte on the same conditions, and the dependability of measurement data improves. Moreover, the amount of floodlighting to garden stuff can be changed according to the class of garden stuff which is analyte. Therefore, since the absorption spectrum of the analyte which cannot penetrate light easily is measurable, the internal quality of garden stuff can be measured more correctly, without being based on the class of analyte.
[0183] Moreover, in this invention, by detecting the analyte location on a migration means by the upstream from this measurement location of the migration way of analyte, and acting as the monitor of the movement magnitude of a migration means, since it can measure when analyte is in a measurement location surely, measurement precision is raised. Moreover, since it has judged with the measurement error when the analyte location on a migration means is detected on the migration way of analyte on both the upstream and the lower streams of rivers of this measurement location and both have a gap, the analyte which has a question in measurement precision can be recognized, processing of turning the analyte which has a problem further to remeasurement is also possible, and high measurement of certainty is guaranteed more.
[0184] Moreover, by this invention, when measuring the specimen object put in order by the longitudinal direction of a band conveyor, it is that longitudinal direction, and a part without a specimen object can be detected and the calibration of equipment can be performed in this part. Therefore, not only before measurement initiation but after measurement initiation can perform a calibration at any time, and measurement does not interrupt it for a calibration. Therefore, the internal quality of garden stuff can be correctly measured by carrying out the calibration of equipment to the time amount of arbitration, without interrupting measurement.
[0185] Furthermore, since light is floodlighted from the side to analyte with the equipment of this invention and the transmitted light is received in the upper part, while the same amount of transmitted lights as the conventional equipment of a lower part light-receiving mold is securable, there is no constraint to a conveyance system like a lower part light-receiving mold. Therefore, the random measurement which supplies analyte at random on a conveyor also becomes possible, and can be measured continuously well. Moreover, since a light-receiving means can be installed in the space of the equipment upper part without an interference object, assembly and maintenance become easy.
[0186] It is the side of the analyte in a measuring point-ed, and is below the height of analyte, and the stray light can be effectively shaded by preparing a protection-from-light plate in a location higher than the floodlighting location to the analyte top by the floodlighting means. Moreover, when a floodlighting means is formed in both sides on both sides of a migration means, a protection-from-light plate is also prepared in both sides one pair, and can be shaded effectively, without [that accommodation of spacing between both protection-from-light plates is possible, then] interfering in protection-from-light plate spacing with analyte according to the measuring object. Furthermore, it is installed in the upstream rather than the location which performs measurement in moving trucking, and if a transverse-diameter

measurement means to measure the transverse diameter of analyte, and an accommodation means to adjust spacing of a protection-from-light plate based on the output of a transverse-diameter measurement means are established, accommodation of a protection-from-light plate will be attained according to the size of each analyte.

[0187] Moreover, in the equipment of this invention, if a protection-from-light plate is prepared above the height of the analyte in a measuring point-ed, the stray light can shade effectively. Furthermore, if a height measurement means to be installed in the upstream and to measure the height of analyte rather than said predetermined location in moving trucking, and an accommodation means to adjust the height of a protection-from-light plate based on the output of this height measurement means are established, it can be set as the location which can perform effective protection from light, without interfering in a protection-from-light plate with analyte according to the height of each analyte.

[0188] Moreover, a size measurement means to be installed in the upstream and to measure at least the height of analyte, or one side of the transverse diameter in the equipment of this invention rather than the location which performs measurement in moving trucking, The protection-from-light plate which is a protection-from-light plate for shading so that the light reflected on the light and the analyte front face which were directly floodlighted from the floodlighting means may not go into a light-receiving means, is prepared near the analyte in a measuring point, and can carry out a drive to the circumference of a predetermined horizontal axis, By establishing an accommodation means to adjust the angular position of the circumference of said horizontal axis of a protection-from-light plate so that the clearance between a protection-from-light plate and the analyte in said predetermined location may become small, based on the output of a size measurement means, effective protection from light can be performed according to the size of each analyte.

[0189] Moreover, it is a protection-from-light plate for shading so that the light reflected in the equipment of this invention on the light and the analyte front face which were directly floodlighted from the floodlighting means may not go into a light-receiving means. It is prepared near the analyte in the location which measures, and a drive can be carried out to the circumference of a predetermined horizontal axis. When analyte is moved by the migration means, said predetermined location is approached, it is pushed up by this analyte, a drive is carried out to the circumference of said horizontal axis and this analyte is in said predetermined location, effective protection from light can be performed with an easy configuration by preparing the protection-from-light plate which shades where analyte is touched. In this case, a protection-from-light plate is smoothly made analyte, without catching analyte in a protection-from-light plate by preparing the upward curling for permitting missing this protection-from-light plate upwards, when analyte is touched in the corner of the side which is the moving trucking upstream of a protection-from-light plate, and touches analyte.

[0190] Moreover, the stray light can shade effectively by constituting so that it may have opening which was able to be opened so that this tray might have covered a part of received analyte [at least] in the equipment of this invention using the tray for receiving analyte fixed on the migration means and the light from said floodlighting means might reach analyte.

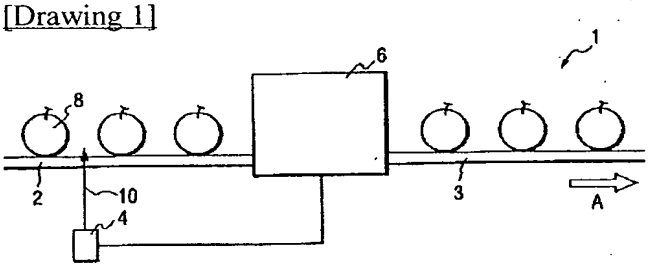
[Translation done.]

* NOTICES *

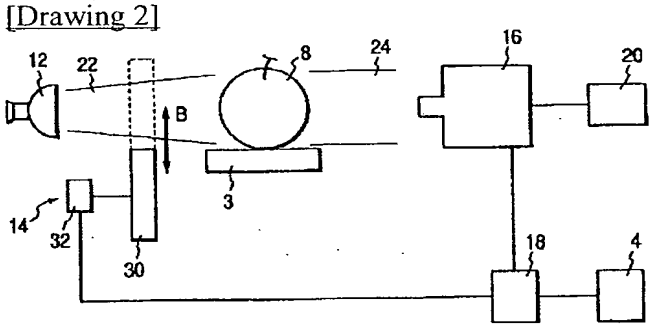
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

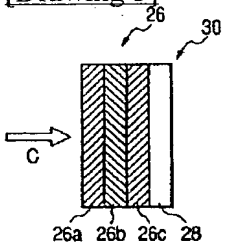
[Drawing 1]



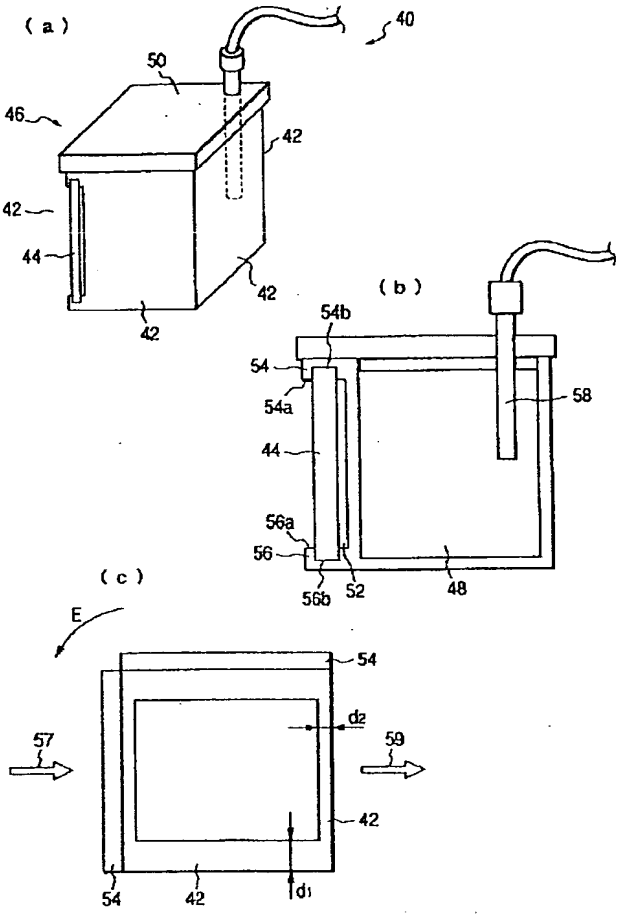
[Drawing 2]



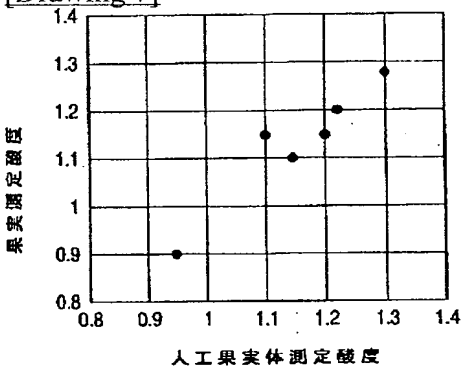
[Drawing 3]



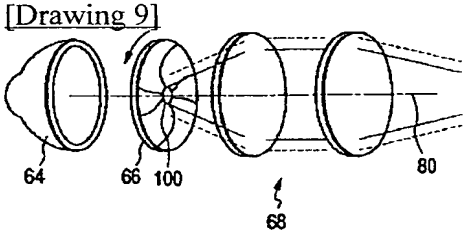
[Drawing 4]



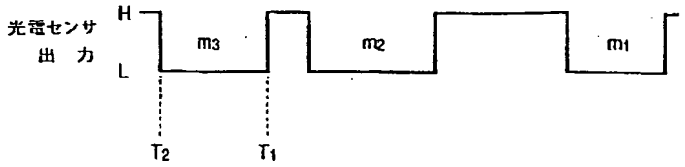
[Drawing 7]



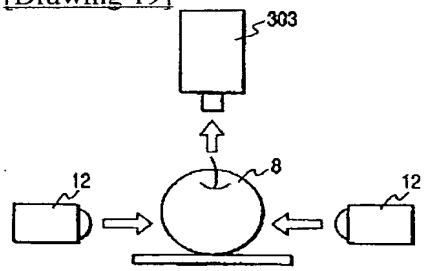
[Drawing 9]



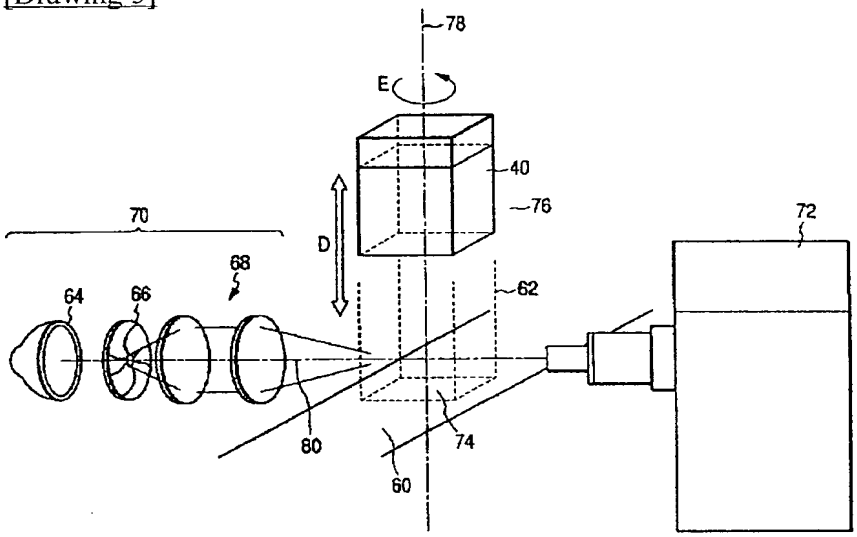
[Drawing 13]



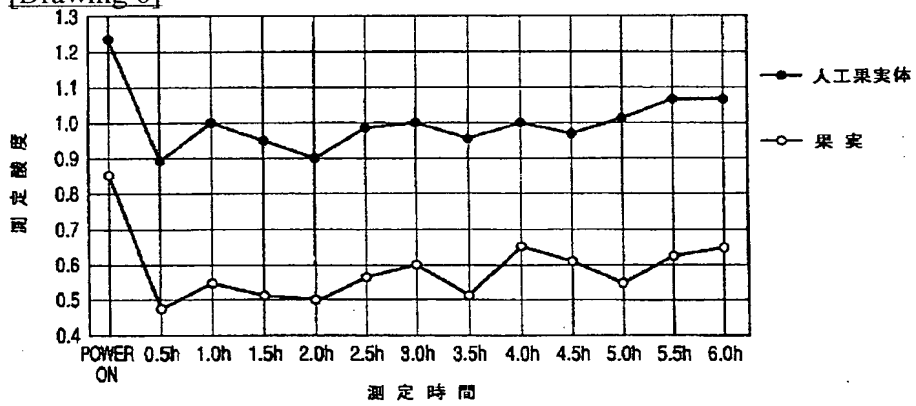
[Drawing 19]



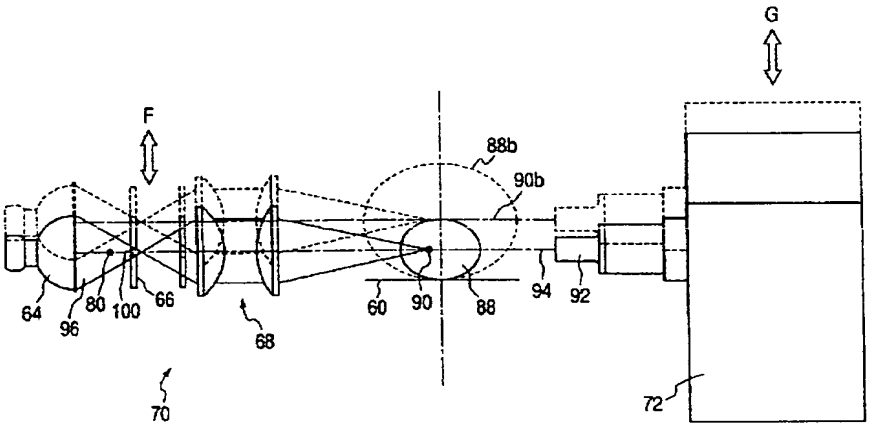
[Drawing 5]



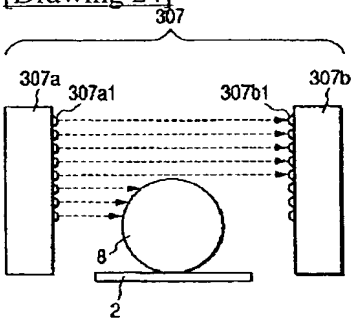
[Drawing 6]



[Drawing 8]



[Drawing 24]



[Drawing 28]

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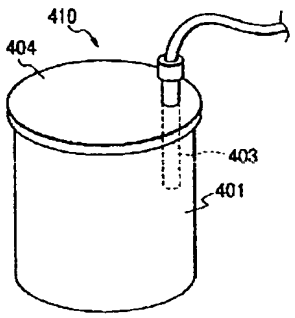

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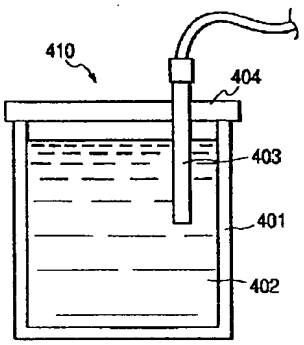
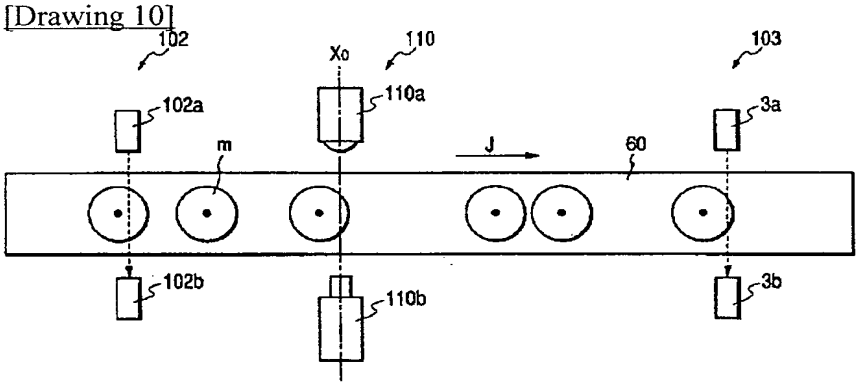
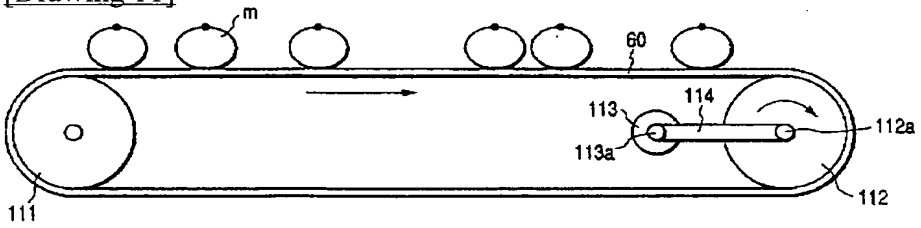


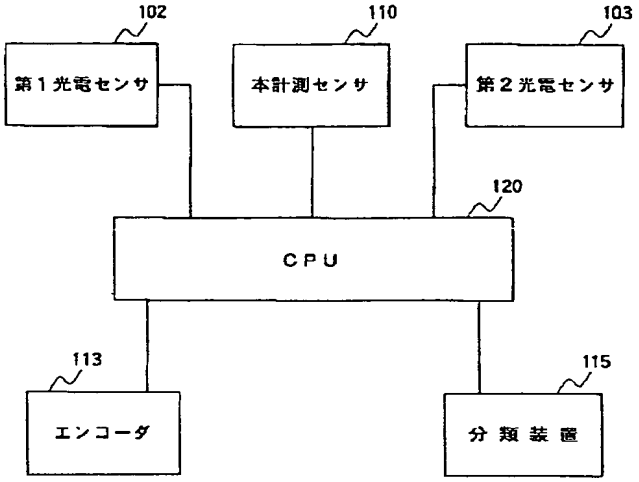
[Drawing 10]



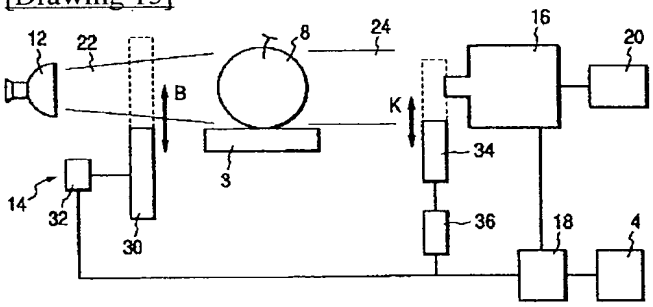
[Drawing 11]



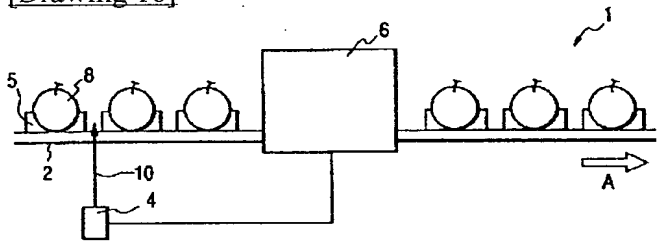
[Drawing 12]



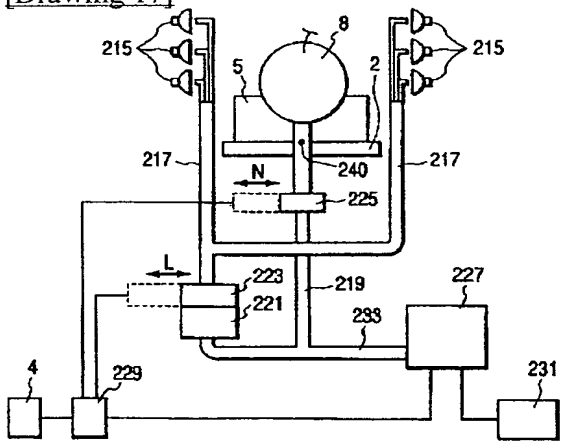
[Drawing 15]



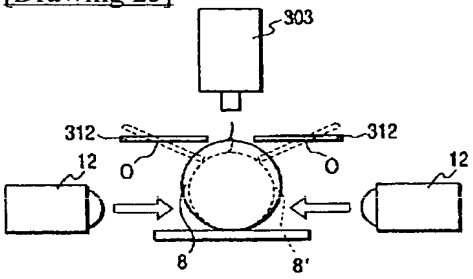
[Drawing 16]



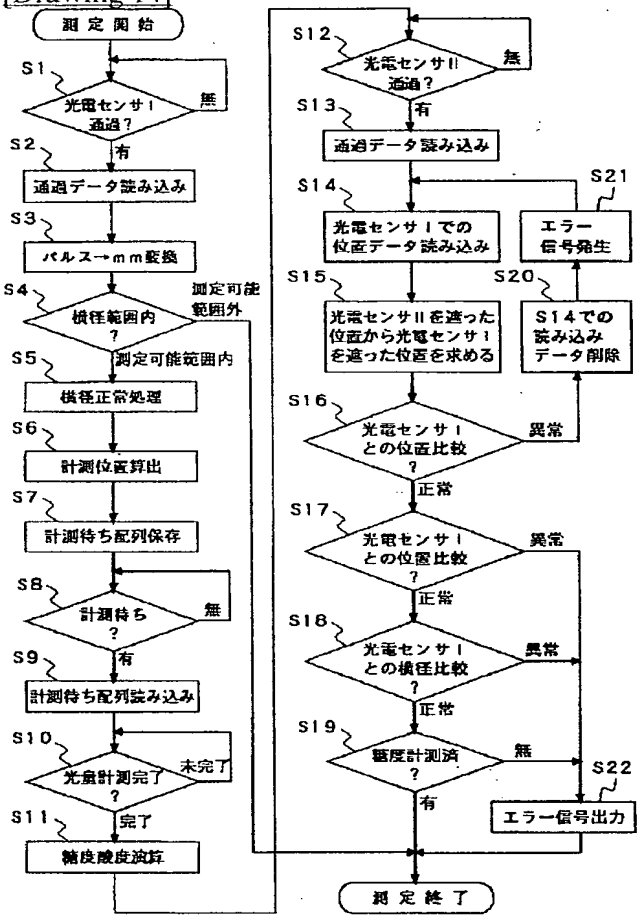
[Drawing 17]



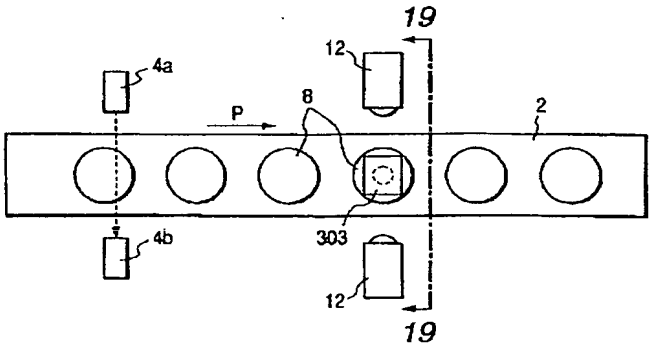
[Drawing 25]



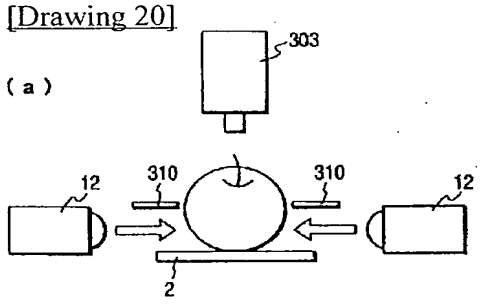
[Drawing 14]

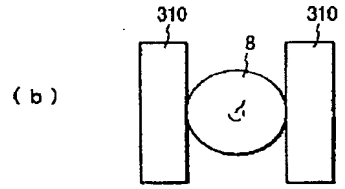


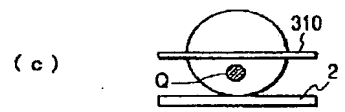
[Drawing 18]



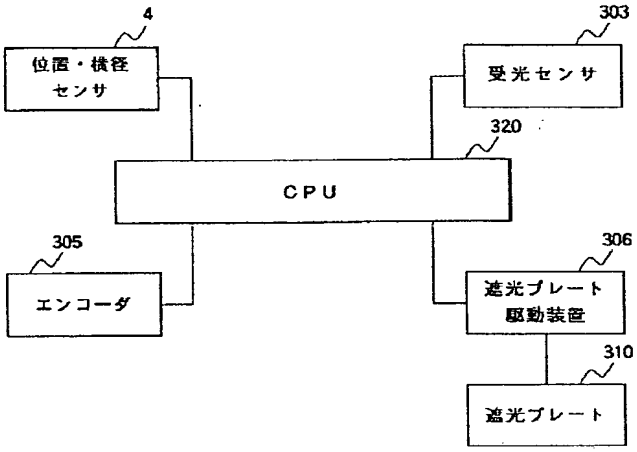
[Drawing 20]



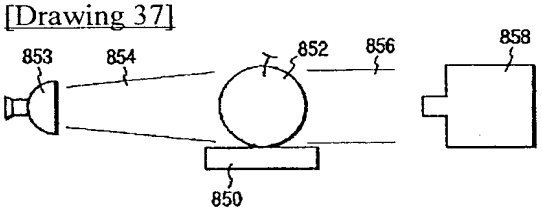




[Drawing 21]



[Drawing 37]



[Drawing 22]

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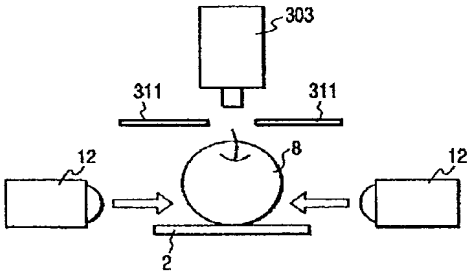

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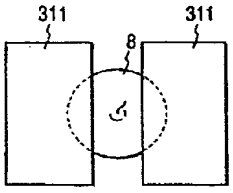
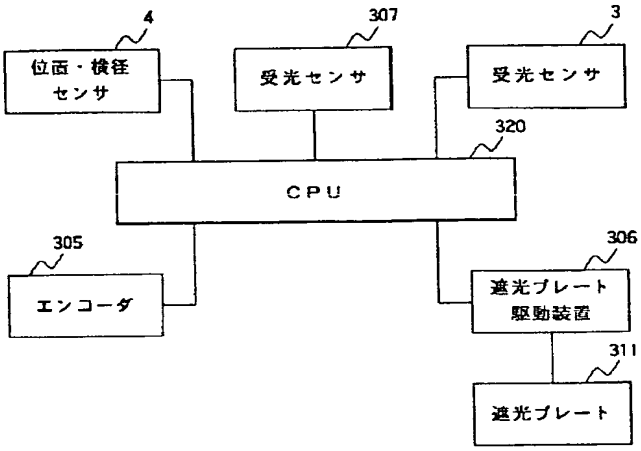
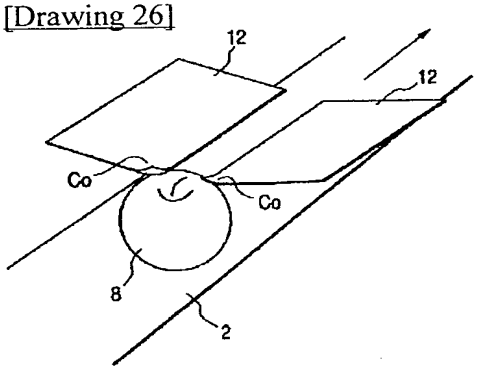


[Drawing 23]

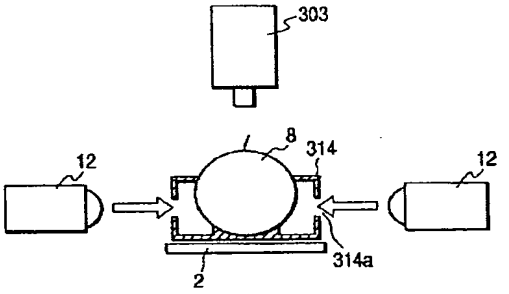


[Drawing 26]

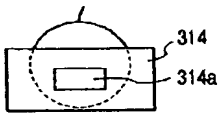


[Drawing 27]

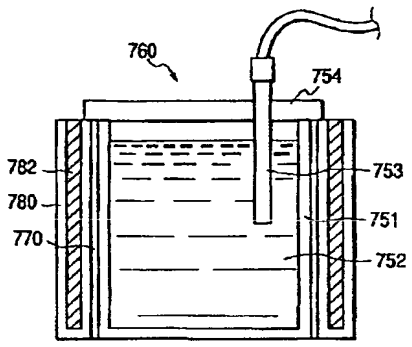
(a)



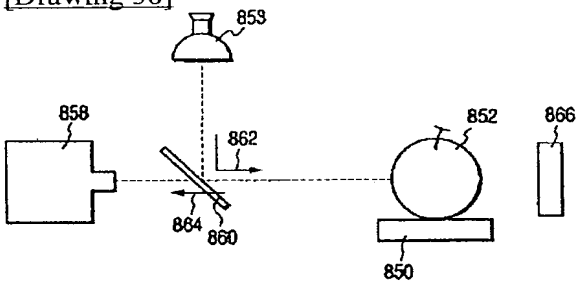
(b)



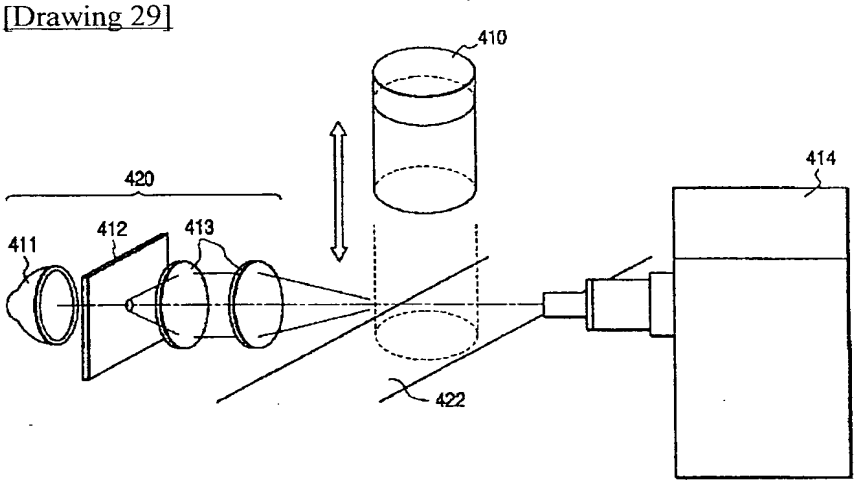
[Drawing 36]



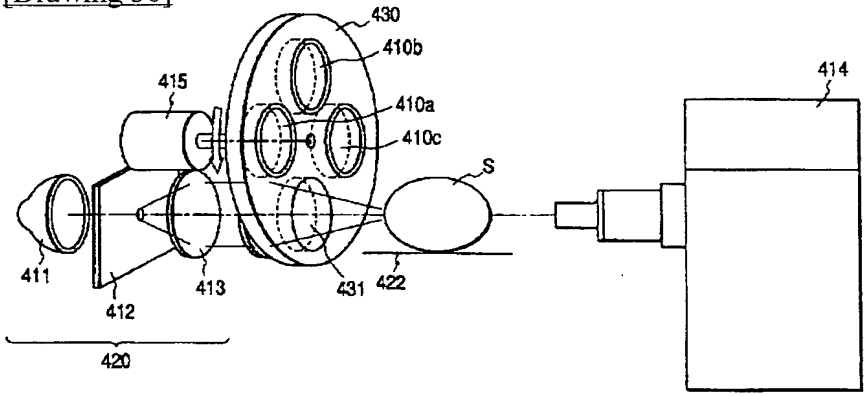
[Drawing 38]



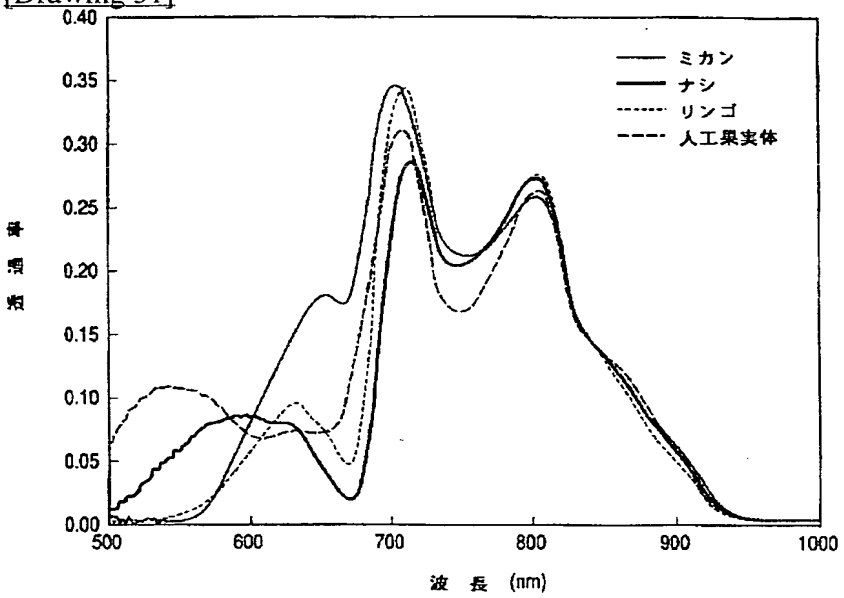
[Drawing 29]



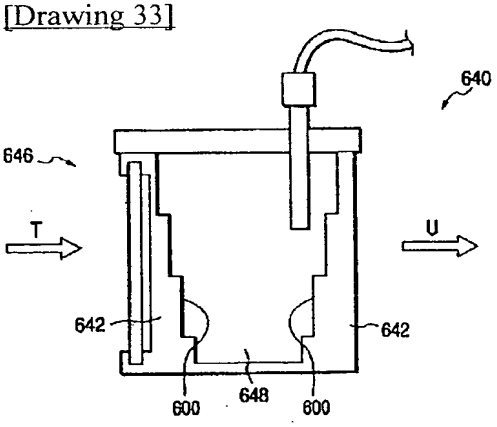
[Drawing 30]



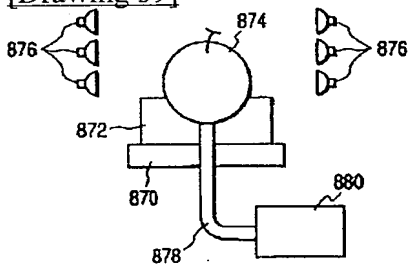
[Drawing 31]



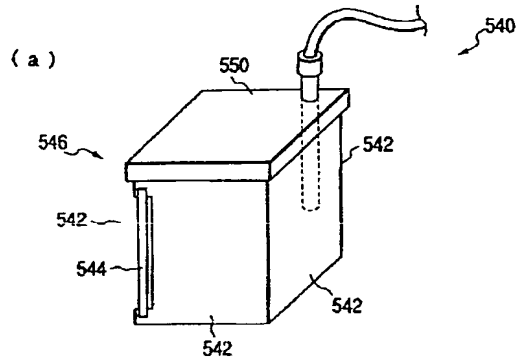
[Drawing 33]

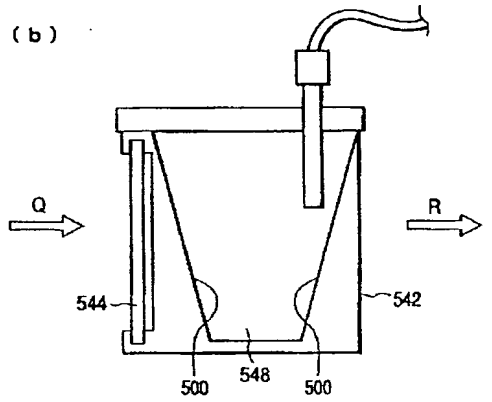


[Drawing 39]

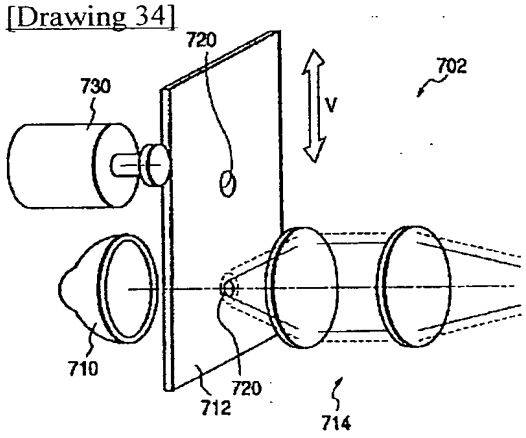


[Drawing 32]

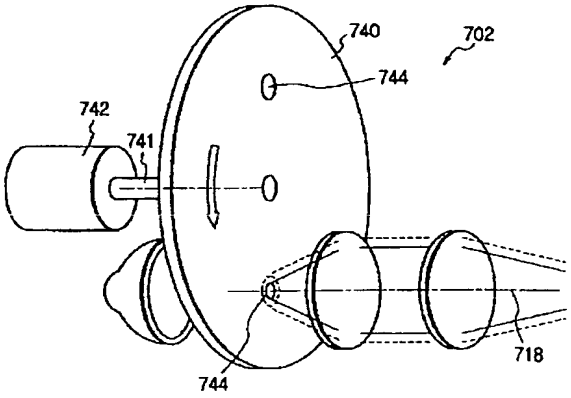




[Drawing 34]



[Drawing 35]



[Translation done.]